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TO THE FIELDS OF PSYCHOLOGY

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An Introduction *to the* Fields of Psychology

by

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TO THE
PARENTS
OF
THE AUTHORS

Preface

FOR SOME TIME the authors have felt the need for a book that would in a brief way answer some of the questions confronting students toward the end of the first course in psychology. What are the major fields of psychology? What are some of the everyday applications of psychology? If further courses are pursued, which are likely to be the most interesting or the most profitable?

No available text seemed to answer these questions, or to round out the introductory course, or to supplement any of the general texts. The only choice appeared to be between the regular texts for a full course in applied psychology, and books that were much too heavy and extensive for the purpose. There was abundant material, but it was too scattered to be available for large classes.

The present text is designed to give a brief introduction to the fields of psychology. An effort has been made to present the material clearly and accurately, avoiding technicality on the one hand and superficiality on the other. References at the close of each chapter suggest additional material for the reader who desires to delve more deeply into the matter.

The authors wish to express their appreciation to the various publishers who graciously permitted quotation from their publications; to Miss Zoe Wells, who reproduced for use in the text the diagram presented on page 190; and to Dr. Louise Omwake, who not only read the material while it was still in temporary form and offered valuable suggestions, but who also used it with her classes

No matter how faithfully the authors might try to acknowledge their indebtedness to the many sources of information represented in the book, it would be quite impossible for them to be specific. Family, teachers, colleagues, books, students—all manner of sources through the years—have made their contributions, and for these contributions the authors are most grateful.

EMILY S. DEXTER

KATHARINE T. OMWAKE

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An Introduction
to the
Fields of Psychology

CHAPTER I

History of Psychology

ALTHOUGH THE roots of psychology can be traced far back into the past, modern scientific psychology is a comparatively recent development. Sixty years ago there were no psychologists. The first psychology laboratory was started by Wundt at the University of Leipzig in 1879. In 1883 the first American laboratory was opened at the Johns Hopkins University by G. Stanley Hall, one of Wundt's pupils. In 1889 Harvard bestowed on William James the title of "Professor of Psychology," the first in the world. Progress was rapid in those pioneer days. Journals for the publication of psychological studies were founded, and laboratories were opened in the leading universities. In 1892 the American Psychological Association was founded with thirty-one members, most of whom, to be sure, were not primarily psychologists, but philosophers interested in the rapidly developing new science. Today there are twenty-one hundred members and associate members of this organization. Of the original founders, only a half dozen would qualify for membership today as far as technical training is concerned.

Such a survey points out the recency of the elevation of psychology to the status of a science. Yet more than two thousand years ago the same problems that are dealt with today arose, and were attacked in much the same

way. Problems of mind and body relations, of function and structure, are still being investigated, and are still unsolved. Man still attempts to discover the ultimate nature of things, a problem undertaken by the earliest Greek philosophers, who thought the universe reducible to one or more simple elements, such as water or air. To-day the biologist works with cells, the physicist with atoms, the psychologist with sensations, ideas, or reflex arcs—and the search still goes on to break up these units into finer ones.

The modern materialistic behaviorists had their earliest forerunners in the Atomists of Greece in the fourth century B. C., who explained perception, sensation, and even the very soul as resulting from the impact of material atoms. Aristotle formulated laws of association in much the form in which we have them today. Plato anticipated psychoanalysis in a remarkable way, while in Leibnitz, centuries later, is found an additional forerunner of the modern psychoanalytic theory of the unconscious. The conditioned reflex, seized upon with such avidity by psychologists since the discovery of its mechanism in the early twentieth century, was recognized by Descartes three hundred years ago. Many of the newest phases of modern psychology are merely reconsiderations of problems already hundreds or even thousands of years old.

Present-day psychology has emerged from two entirely distinct streams—on the one hand from philosophy, on the other from physiology.

Contributions from philosophy. Interest in psychological problems was merely incidental in philosophy. Only as a side issue in their efforts to comprehend the universe did philosophers ask themselves, "How can we know?" and attempt observations of thought processes

and sensations. Consequently, until a few decades ago, discussions of psychological topics were scattered through works primarily philosophical in nature. The student seeking in philosophy for psychological facts or theory succeeds only in gleaning a few pages here and a paragraph there.

Two Greek philosophers who did most to advance the development of psychology, Plato (427–347 B. C.) and his pupil Aristotle (384–322 B. C.), represented fundamentally different ways of approaching the development of a system of knowledge. Plato assumed broad, general truths, and by deduction showed how others must follow from these. This is essentially the method of philosophy. Aristotle, on the other hand, started with specific observations and built up general principles using induction, the method of science. Aristotle is often called the “Father of Science” because of the stress he placed on observation and experiment as means of arriving at the truth.

The following quotation shows the striking similarity between Plato’s interpretation of dreams and that of the modern Freudian psychoanalyst:

Certain of the unnecessary pleasures and instincts are deemed to be unlawful; every man appears to have them, but in some persons they are subjected to the control of law and reason [“sublimated”], and the better desires prevailing over them, they are neither wholly suppressed, or reduced in strength and number; while in other persons these desires are stronger and more abundant. I mean particularly those desires which are awake when the reasoning and taming and ruling power [“censor”] of the personality is asleep; the wild beast in our nature, gorged with meat and drink, starts up and walks about

naked, and surfeits at his will; and there is no conceivable folly or crime, however shameless or unnatural—not excepting incest or parricide [“Oedipus complex”]—of which such a nature may not be guilty. . . . But when a man’s pulse is healthy and temperate, and he goes to sleep cool and rational, . . . having indulged his appetites neither too much nor too little, but just enough to lay them to sleep, . . . he is then least likely to be the sport of fanciful and lawless visions. . . . In all of us, even in good men, there is such a latent wild beast nature, which peers out in sleep.¹

However, from the point of view of psychology, Plato’s importance lies primarily in the fact that he formulated a clear-cut distinction between mind and matter that has persisted to the present day. Plato placed ideas, revealed by reason, in a world by themselves, and regarded them as far more real than the world of things revealed by the senses. He identified mind, the knower, with the beautiful and the good; matter, the world known to the senses, he considered ignoble, to be struggled against. There is still a tendency to regard mind as lofty and noble, and matter or body as base.

Aristotle made no such sharp distinction between body and mind, or as he put it, between matter and form. Matter and form, said Aristotle, are always related; neither exists apart from the other. The body exists for the sake of the mind or soul, but the soul has its existence only in and through the body. The activities of the soul, then, are essentially activities of particular organs of the body. Just as seeing would be impossible without eyes,

¹ Durant, Will, *The Story of Philosophy*, pp. 33–34. Garden City Publishing Co., 1926. Copyright in hands of Simon and Schuster, Inc., N.Y.

so thinking or striving could not take place without the appropriate bodily organs. Psychological processes are definitely functions of physical structures—the “form” of the material substance. Although Plato held the role of sensation in knowledge to be little more than awakening ideas already present in the soul, Aristotle believed that sensations furnished the real materials of knowledge. Only on the basis of repeated observations could knowledge be obtained. Aristotle himself applied the inductive method he advocated, paving the way for empirical science.

In addition to his incidental treatment of psychological processes, Aristotle made a specific contribution to psychological theory in his discussion of memory, in particular in his laws of association. Recall or association by similarity, by contrast, and by contiguity in space and time were given as empirical rules. Evidences of the influence of these principles formulated by Aristotle are seen in the most recent discussions of association.

After Aristotle, there were few significant advances in psychological knowledge for nearly two thousand years. However, Augustine (354–430) should be mentioned, for his way of looking at psychological processes has molded psychological thought ever since. His psychology, adopted by the church, has had wide influence and is still the psychology of the man on the street. Augustine was the first to point out that observation of the activities of the self might constitute a method of arriving at knowledge, a suggestion which ultimately led to the refinements of modern introspection. In Augustine’s writings are found the beginnings of “faculty psychology,” the tendency to think of memory, will, reason, and other capacities, as relatively independent and capable of being

developed separately. In the succeeding centuries, belief in separate compartments of the mind became more and more firmly intrenched, until finally Gall (1758–1828) thought he had discovered the exact location in the brain of over thirty separate faculties. Now the pendulum has swung in the opposite direction, and modern psychologists, in reaction against an overemphasis on specific localization of function, tend to repudiate faculties and to talk of action of the nervous system in widespread neural patterns.

A list of the philosophers who have made significant contributions to psychological knowledge and theory would include virtually all the great philosophers from ancient to modern times. Beginning with Plato and Aristotle, it would include Descartes (often said to have ushered in modern psychology), Hobbes, Locke, Herbert, and many others, each adding something in the development of psychological theory. In a treatment of this sort it is impossible to do more than mention those who have been most influential. The nature of the subject, as well as the complexity of the background of philosophy, makes a superficial account highly unsatisfactory, yet in a treatment as brief as this it is manifestly impossible to do justice to the many diverging lines of philosophical thought of consequence to psychology.

By the seventeenth century, philosophy in England was developing along radically different lines from that on the continent. The English philosophers of that period showed an inductive spirit, a zeal for direct observation of the facts of mind, with little interest in metaphysical explanations of the ultimate nature of things. While continental philosophers speculated on the relation of mind and body, and the dependence of each on God,

Locke and Hobbes were asking how sensations are aroused; why we are not aware of an impression between its first appearance as sensation and its reappearance as memory; and what is the nature of mental processes. These problems were attacked from an empirical point of view. The observation method was used as far as possible, and little attempt was made to speculate on questions not amenable to the observational approach. To these particular English philosophers, knowledge of human nature was but a steppingstone to the understanding of government, and not an end in itself; but psychology profited in being turned from speculation to careful observation.

Contributions from physiology. Present-day psychology owes at least as much to science as to philosophy. The earliest contributions from science came from the two great physicians, Hippocrates, often termed the "Father of Medicine," in the fifth century B. C., and Galen, seven hundred years later. These medical men influenced psychology most in calling attention to the relation of mind to body, especially the relation of mental states to disease processes, and in showing the effects of brain injury on mental functioning. Hippocrates formulated a theory that the four important elements of the universe, earth, air, fire, and water, had their counterparts in the body: the cold, earthy element represented by phlegm, the airy element by yellow bile, the fiery by blood, and the watery by black bile. Health depended on the proper mixture of these elements within the body. Galen carried the idea of the four humors further, accounting for temperaments by the strength of one or another of these humors: phlegmatic (excess of phlegm), choleric (excess of yellow bile), sanguine (excess of

blood), and melancholic (excess of black bile). These terms are in common use even today. Perhaps we have a modern parallel of Galen's humors in the endocrine secretions which circulate in the blood stream, a hypothyroid condition causing a phlegmatic temperament, a hyperthyroid condition leading to a choleric disposition, hyposecretion of the gonads producing melancholia, and a normal glandular balance the sanguine temperament.

Galen (130-200) also materially advanced knowledge of anatomy and of the nervous system, using the then revolutionary method of experiment and dissection. Whereas Aristotle had contended that the seat of intelligence was in the heart, Galen proved it to be in the brain. He pointed out that nerves lead from the sense organs to the brain, and from the brain to the muscles, and recognized the fact that brain injuries produce paralysis. Since his knowledge of human anatomy was derived chiefly from dissections of pigs and apes, errors crept into his medical writings. So great was the veneration in which Galen's writings were held for the succeeding fourteen centuries, that when later medical men made discoveries inconsistent with the teachings of the master, they discarded their findings as untrue. Hence the very perfection of the medical system which Galen developed prevented men from thinking and experimenting for themselves, and prolonged blind acceptance of authority.

Now and then during the Middle Ages there were discoveries that changed the course of thought in certain fields of knowledge, but each was followed by a long period in which no further advance was made. Not until early in the nineteenth century was systematic, concerted work on scientific problems begun by scientists in all

civilized countries, particularly in England, France, and Germany. They discovered all sorts of curious facts about the senses; as for example, that sensitivity on the skin is centered in certain regions in which specific sense organs for warmth, cold, touch, and pain are located; and that the periphery of the retina is color blind. They experimented on primary colors, primary odors, and estimation of distance, and gave modern psychology most of its physiological background.

With typical German thoroughness, four German physiologists performed experiments and arrived at conclusions of monumental importance to the psychology which was emerging. These physiologists were Weber, Fechner, Helmholtz, and Wundt.

Weber (1795–1878), whose name is attached to one of the best-known laws of psychology, is notable particularly for his experiments on space perception on the skin, and for initiating investigations on the intensity of sensation. He determined the smallest distance of separation of two points in contact with the skin at which the points could be distinguished as two. He found that this distance, the two-point limen, varied on different parts of the body. On the finger tips, points a sixteenth of an inch apart are felt as two, while on less sensitive regions of the body, stimulation of two points as much as two inches apart may give a sensation of one contact. In weight-lifting experiments Weber found that the just-noticeable difference between two weights is always a definite fraction of the original weight, and not an absolute value. Thus he found that when he lifted a weight of thirty-two ounces, he could notice the addition of one ounce; when he lifted a four-ounce weight, the addition of one-eighth

of an ounce was just perceptible. Weber found it possible to express the just-noticeable difference in terms of a constant ratio, in this instance 1:32.

Although Weber himself did not consider this generalization of particular significance, Fechner (1801–1887) seized upon it as of vital importance, seeing in it a connection between the physical and mental worlds, a possibility of showing an exact mathematical relationship between the strength of the stimulus and the sensation. Fechner devoted his lifetime to verifying Weber's law. Between 1855 and 1859 Fechner alone made 67,072 comparisons. He found the constant ratios he sought between the magnitude of the weights themselves and the just-perceptible difference between them, but this was not his chief significance for psychology. Fechner's work was important because it proved conclusively that problems in psychology can be subjected to quantitative methods and yield mathematical data. The methods that Fechner developed in pursuing his experiments became the chief methods of experimental psychology in its early years, and are still recognized tools of research in psychology. The application of the point of view of quantitative measurement of different aspects of mental capacities is seen in the rapid development of intelligence tests, of achievement tests, and of the use of statistical measures in solving psychological problems. It is probably not overstating the case to say that with Fechner, psychology ceased to be a branch of philosophy and became an experimental science.

Valuable additions to psychological theory and knowledge were made by Helmholtz (1821–1894), one of the outstanding scientists of the nineteenth century, whose researches on the eye and ear are counted among the

greatest achievements of science. He worked over all existing knowledge on these subjects, experimented, tested, devised apparatus for further experimentation, and formulated theories. Helmholtz's theory that all color vision can be explained on the basis of three primary colors, and his resonance theory of hearing, are even today among the best in the field. Helmholtz was also the first to measure the speed of the nerve impulse, foreshadowing the reaction-time experiment.

The importance to the development of psychology of Helmholtz's investigations can hardly be overestimated. They showed conclusively that the experimental methods used in physiology were also applicable in the psychological study of sensation and perception. The psychophysical methods, yielding quantitative data on sensation, had already been devised by Weber and Fechner. Apparatus had been invented and special techniques worked out for pursuing studies primarily psychological in nature. The time was ripe for the appearance of a science of psychology based on physiology.

Emergence of psychology as a separate science. Wundt (1832-1920), who in his youth was Helmholtz's assistant, is said to share with Fechner the honor of being the founder of experimental psychology. In 1879, at the University of Leipzig, where he was professor of physiology, Wundt founded the first laboratory specifically for instruction and experimentation in psychology. He also established the first journal for the publication of psychological investigations, and contributed to it many articles on research performed in his laboratory. He experimented and wrote voluminously, presenting the results of his own experiments, as well as systematizing the psychological knowledge of that day into an effective

organization. In his laboratory Wundt trained and inspired enthusiastic students who carried back to their own countries the methods and points of view of the new science.

Wundt's ideal was to check by careful experiments all psychological theories and facts; to assume nothing, but to rely on proved fact as the foundation of psychology. The method was closely allied to that inherited from the physiological laboratories—a technique involving a controllable stimulus, an objective response, and simultaneous introspection. Students who could not become efficient, trained introspectionists found no place in Wundt's laboratory. Experiments stressing the introspective side, but aiming always to be exact and scientific, were carried out on muscular reaction time, verbal reactions, sensation, perception, and illusions.

Wundt's students, returning home and founding laboratories of their own, carried the Wundtian tradition into many lands. One of the most influential of those who brought Wundt's point of view into the United States was J. McKeen Cattell, Wundt's first assistant in the laboratory at Leipzig. After leaving the laboratory, Cattell was associated for a year with Galton in England, where he learned the application of statistical methods to the study of individual differences. Even while working in Wundt's laboratory, where general truths applicable to all people received primary emphasis, Cattell had been interested in the differences between people and in measuring these differences. From his association with Galton he learned numerous techniques for measuring individual differences, as well as statistical means of handling the data. Upon his return to America, Cattell became professor of psychology at Columbia University, director of

the laboratory there, and editor of numerous psychological journals. The fact that psychology in America has stressed the measurement of individual differences more than has that of any other country is traceable primarily to Cattell's continued interest in individual differences.

G. Stanley Hall, director of the psychological laboratory at Clark University, later president of that university and leader of the Child Study Movement, was another American who studied in Wundt's laboratory and who brought back to America the Wundtian tradition in psychology. In addition to training numerous younger psychologists at Clark, Hall traveled all over the country, making thousands of speeches on various aspects of psychology, stressing particularly the study of children, and arousing the interest of parents and teachers in child psychology. Hall was also the instigator in the formation of the American Psychological Association.

Only one influential American psychologist visited Wundt's laboratory and remained unimpressed by the new psychology developing there. This independent individual was William James, probably the greatest of American psychologists. He had worked with Wundt in earlier days at Heidelberg, and later returned to Germany and observed carefully the developments at Leipzig, but after the latter visit he wrote almost regretfully:

But psychology is passing into a less simple phase. Within a few years what one may call a microscopic psychology has arisen in Germany, carried on by experimental methods, asking of course every moment for introspective data, but eliminating their uncertainty by operating on a large scale and taking statistical means. This method taxes patience to the utmost, and could hardly have arisen in a country whose natives could be *bored*. Such Germans as

Weber, Fechner, Vierordt, and Wundt obviously cannot; and their success has brought into the field an array of younger experimental psychologists, bent on studying the *elements* of the mental life, dissecting them out from the gross results in which they are imbedded, and as far as possible reducing them to quantitative scales. The simple and open method of attack having done what it can, the method of patience, starving out and harassing to death is tried; the mind must submit to a regular *siege*, in which minute advantages gained night and day by the forces that hem her in must sum themselves up at last unto her overthrow. There is little of the grand style about these new prism, pendulum and chronograph-philosophers. They mean business, not chivalry. What generous divination, and that superiority of virtue which was thought by Cicero to give a man the best insight into nature, have failed to do, their spying and scraping, their deadly tenacity and almost diabolic cunning, will doubtless some day bring about.¹

Obviously, James found laboratory work anything but congenial, so it is not surprising that at the first opportunity he turned the direction of the psychological laboratory at Harvard over to an assistant. At Harvard University, James taught the first course ever to be entitled specifically "Psychology." At this time in American universities it was customary to include a little psychology in the course on moral philosophy, which was ordinarily taught by the president of the institution—a minister—with emphasis on moral exhortation. James' students were fortunate in having psychology presented fascinatingly with emphasis on experience and on the physiological background of mental phenomena. Under

¹ James, W., *Principles of Psychology*, Vol. I, pp. 192-193, Henry Holt, 1890.

his tutelage, psychology almost immediately became a very popular as well as substantial subject.

James' *Principles of Psychology*, published in 1890, extended the influence of the young science. Students in numerous institutions had their first view of psychology through James' interesting text, a book remarkable for its style and vividness of treatment, as well as for the originality of many of its theories. The now-famous theory of emotions appeared in this text. Throughout the book James stressed the physiological and neurological foundations of mental life, a point of view that markedly influenced psychological thought in the United States.

Laboratories soon sprang up all over the country. By 1894, there were laboratories in twenty-seven institutions, and now scarcely a recognized university or college is without one. Whereas until the nineteenth century psychology had been advanced largely by the efforts of philosophers and other individuals not connected with any institution of learning, psychology today advances primarily through the research and experimentation of college professors, graduate students, and research workers connected with colleges and universities. With the development of widespread interest in psychology, and attacks on psychological problems by many individuals, the course of development becomes rather that of devising new methods, new points of view on fundamental topics, and the gradual accumulation of data, than of startling discoveries by individual men.

Several of the most fruitful developments of the early twentieth century have been importations from abroad, such as the intelligence test devised by Binet, and the conditioned-reflex mechanism discovered by Pavlov, both

highly influential in determining the course of psychology throughout the civilized world. The same period in the United States has marked the beginning of animal psychology, in addition to a practical psychology applied in industry, in advertising, in testing over a million men during the World War, and millions of school children since then, and in many other fields. These practical applications are probably the most characteristic American contributions to psychology.

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CHAPTER II

Schools of Psychology

AMERICA HAS proved extraordinarily receptive to psychological theories and systems imported from Europe, quick to seize upon a new technique developed elsewhere, but singularly slow to originate new theories at home. In the United States there are more psychologists, and a greater number of active psychological laboratories, than anywhere in Europe, yet we continue to look to Europe for points of view, and to accept with docility almost any innovation tagged with a foreign name. Of the numerous divergent points of view in current American psychology, termed "schools of psychology," the majority have come directly from Europe. Existentialism, the first "school" to be imported, was brought to Cornell by an Englishman, Titchener, who in turn had gained his viewpoint in Germany. Psychoanalysis, originated by Freud, Jung, and Adler of Austria, found ready acceptance in the United States. Gestalt psychology, the most recent hypothesis of a psychological nature adopted in America, came from Germany, introduced by Koffka and Köhler. Of the outstanding schools, only behaviorism, led by Watson, is a distinctly American product; and even this was not a distinct and vital system of psychology until after Lashley had incorporated in it the conditioned-reflex mechanism from Russia. In

addition to these generally accepted schools, other more or less clearly defined views are often included in the lists of American schools of psychology. Purposive psychology, brought from England by McDougall, is one of these. Another is dynamism, Woodworth's point of view; and still others might be mentioned.

Twentieth-century psychology presents a situation not found to a similar extent in any other science; namely, a multiplicity of points of view regarding subject matter and method, the advocates of each promoting with enthusiasm their own one-sided approach, at the same time regarding with disapproval every other line of attack. It is possible that the existence of these unreconciled points of view is an indication of the youth of psychology as a science, since only recently did it branch off from philosophy, a field characterized by conflicting beliefs. Perhaps the modern schools of psychology are merely evidence of outgrowth from philosophy. Possibly they indicate the presence in a new science of hypotheses in process of being tested and verified. In the latter case they are a normal manifestation of growth, perhaps a kind of "growing pain," not to be expected to endure.

Existentialism. Of the many students returning from Wundt's laboratory in Leipzig, none was more thoroughly imbued with the Wundtian tradition than Edward Bradford Titchener, who became director of the laboratory at Cornell immediately after his return from Germany. At Cornell, Titchener taught an experimental psychology that aimed at the analysis of the contents of consciousness by careful and controlled introspection. He exerted a lasting influence on American psychology not only by his positive accomplishments, but also by so rigidly limiting the field of psychology that other psychologists,

rebellling against the restrictions of his system, formulated schools of thought of their own.

Titchener (1867-1927) studied first at Oxford, and then completed the work for his doctorate under Wundt at Leipzig. In the fall of 1892 Titchener became director of the psychological laboratory at Cornell, where he remained until his death. Neither his youth in England nor thirty-four years spent in the United States influenced him as much as his two years in Leipzig. He looked like a German; the psychology he taught was German to the core; the ceremonial with which he surrounded his teaching (he always lectured in his Oxford Master's gown) was that which he had observed in a German university. Throughout his lifetime in America he strove to keep pure from contamination by any practical application the experimental psychology he had brought with him from Leipzig. Titchener's appearance, his genial but authoritative manner, and his steadfast adherence to the scientific study of psychology combined to give him a unique position as a psychologist. To him belongs considerable credit for gaining for psychology recognition as a science. No American has enjoyed so enviable a reputation abroad as he. Yet in the United States his point of view has been significant chiefly as that *against* which other psychologists rebelled, pursuing their studies of animals and individual differences, and their measurements of intelligence in spite of the scornful disapproval of the self-appointed guardian of the Wundtian tradition.

The whole point of the new psychology, as Titchener saw it, was that it was an extension of scientific method into a new field. His chief objective was to show that the subject matter of psychology is a legitimate field for

scientific study. All sciences, Titchener explained, have their starting point in experience. Physics and psychology have fundamentally the same subject matter, that is, the world of experience, which each regards from a different point of view. Physics is the study of the world of experience independent of the experiencing person; psychology, the world of experience dependent on the experiencing individual, viewing the contents of consciousness as "existent" reality. Titchener's formal definition of the subject matter of psychology is "experience dependent on an experiencing person."

Titchener not only defined the field of psychology, but as rigorously limited the methods which psychology may legitimately use. The method he approved was introspection, the subjective observation of experience. By introspection he meant not moody self-contemplation or idle daydreaming, but "hard introspective labor," requiring long training and practice, and running counter to the habits of a lifetime. Ordinary habits of observation predispose one to see the events and objects of daily life rather than the content of consciousness. For scientific introspection it is necessary to lay aside the common-sense attitude and concentrate on the impressions received rather than on the object. Observing in the common-sense fashion, one sees a table, but an introspectionist who "sees a table" while making a scientific investigation of his perception of a table is guilty of the "stimulus error"; that is, he makes the mistake of attending to the object rather than to the experience occasioned in him by the stimulus. Experience gives him only spatial pattern, brightness, and color; all else is but interpretation, not admissible in scientific introspection of experience.

For this reason much emphasis was laid on the necessity for rigorous preparation for true introspection.

By introspective *analysis* the contents of consciousness were to be discovered. Sensations, images, and affection, with their attributes (quality, intensity, duration, and clearness), were units of consciousness. Sensations, the sights, sounds, smells, and tastes of conscious experience, constitute the elements of perception. Images, picturing experiences not present but remembered or imagined, constitute the elements of ideas; and affections, such as joy, sorrow, love, and hate, the elements of emotions. *Titchener's books contain detailed analyses of these elementary processes.* Analysis was followed by *synthesis*, involving an attempt to show the organization of the elements in higher mental processes and the laws of their combination. Typical problems of organization of elements studied by existentialists were how ideas follow each other; how concepts differ in their imagery from sensations or memories and what makes them concepts; how memory images differ from sensations; and how many different levels can be present in consciousness at a time. *Explanation* of the phenomena was sought in their physiological correlates, so that physiology had a place in psychological investigations, although a secondary one, since physiology could contribute nothing directly to knowledge of the contents of consciousness.

A number of important contributions were made by the existential school: (1) It was Titchener's kind of psychology which first gained recognition for the new study as a science; in America existentialism represented a transition from "mental philosophy" to science. (2) Some tangible contributions to psychological knowledge

were made in the fields of sensation, emotion, and thought. Nevertheless, psychology in the United States did not develop along the lines laid down by Titchener, but rather as protests against the restrictions of his system.

Titchener's contemporaries made a number of valid objections to existentialism: (1) It was too limited in problem and method, giving no place in psychology to objective study of animals, or to applications of psychological facts; for psychology, Titchener decreed, must remain a pure, not an applied, science. (2) It was too arid and intolerant to achieve wide popularity. Few American students found either the "hard introspective labor" or the complete disregard for common sense congenial. And Titchener would not admit any method but introspection to be valid. This very intolerance forced those who disagreed with Titchener to take definite stands opposing him—and so the behavioristic school, to take one example, actually arose as a revolt against existentialism. (3) Comparatively little genuine factual content was developed. (4) Titchener's authority was so final and unquestioned that no provision was made for training leaders to succeed him, and on his death the existential point of view was left relatively undefended.

Behaviorism. Behavioristic psychology, advocating the study of human reactions by the purely objective methods of natural science, owed its inception to John Broadus Watson. Born in 1878, Watson received his Ph. D. degree in 1903 from the University of Chicago. His chief interest while at the university was in animal psychology; he himself started the animal laboratory there, and after obtaining his degree, remained for a year in charge of the work in animal psychology. In 1904 he

went to the Johns Hopkins University as professor of psychology. It was at the latter university in 1912-1914 that behaviorism was definitely formulated.

While behaviorism came as a revolt against the dominant American psychology and not as a peaceful outgrowth of it, the background of the revolt had been developing gradually for a number of years. There were three predisposing causes of the outbreak. In the first place, a number of psychologists were beginning to think of psychology as a science of human behavior rather than as a science of consciousness. Cattell, founder of the psychological laboratories at Pennsylvania and Columbia, wrote in 1904: "There is no conflict between introspective analysis and objective experiment—on the contrary, they should and do continually cooperate. But the rather widespread notion that there is no psychology apart from introspection is refuted by the brute argument of accomplished fact."¹ McDougall, in 1905, defined psychology as the "science of the conduct of living creatures." Pillsbury, in 1911, defined it as the "science of human behavior." Evidently Watson was not the only one to think of psychology as the study of behavior. Secondly, objective behavior was already emphasized in laboratory practice. In the third place, animal psychology, investigated by objective studies of behavior, had already made a place for itself in the new science. In 1898, Thorndike's *Animal Intelligence* had started a flood of investigations on animals, particularly the white rat. Pavlov's conditioned-reflex experiment opened still another field to exploration. Watson felt that animal psychology was a

¹ Cattell, J. McKeen, *Popular Science Monthly*, Vol. LXVI, pp. 176-186, 1904.

science in its own right, under no obligation to attempt to translate its behavior studies into terms of "consciousness" or "purpose."

The exciting cause of the outbreak of behaviorism was the repressive attitude of the older psychologists, who were firm in their belief that psychology was the science of consciousness, to be studied most efficiently by introspection. Titchener, most influential of the reactionary group, took the stand that only findings formulated in terms of consciousness were really psychology. Animal studies, said Titchener, might be interesting and important—but not psychology. By opposing behaviorism in its infancy, Titchener drew attention to it, and gave the movement dramatic significance and importance. Watson, far from lacking in aggressiveness, countered by asserting that *only* the animal psychologists were doing scientific work in psychology; that psychology should discard the past, reject introspection, and devote itself exclusively to the objective study of behavior.

In his book *Behavior*, published in 1914, Watson presented his first statement of behaviorism. He defined psychology as a "purely objective experimental branch of natural science," whose goal is prediction and control of behavior. Behaviorism stands for the extension of the methods and point of view of animal psychology into human psychology. The subject matter of psychology is behavior, the activity of the organism as a whole. Behavior is to be studied only by objective methods, for no other methods are valid. Introspection is rejected as being subjective; one cannot see the feelings or thoughts of another, and objective knowledge cannot possibly be derived from subjective observation. The existence of consciousness is denied; it cannot be proved by any test,

and even if it exists it cannot be studied scientifically. Consciousness, therefore, is not admitted as a legitimate object of psychological study.

Psychology confines itself to study of behavior by objective methods. Scientific observation with or without the aid of instruments can be depended upon to give objective, quantitative results. Tests are grudgingly admitted as measures of behavior, but not as an indication of anything as intangible as intelligence. The most important single method in the behavioristic conception is the conditioned-reflex technique developed by Pavlov. This method was seized upon by the behaviorists and cherished with increasing enthusiasm as the implications of the technique were seen. Conditioning affords an objective means of analyzing behavior, which is composed essentially of simple units integrated into larger units by conditioning. It is possible, therefore, to study the very process by which behavior patterns are built up and torn down. Nine-month-old Albert, who was conditioned to fear a white rat, and three-year-old Peter, who was freed by conditioning from his fear of a rabbit, are well-known examples of the application of this mechanism.

The studies of behavior begin at birth to determine what part of behavior is native and what part is acquired. Watson's studies of the emotions of new-born babies opened a new field to experimentation. Babies could be studied by the same objective methods applicable to animals. Babies, said Watson, inherit only bodily structures and their ways of functioning. They have no "instincts," no native intelligence or special artistic gifts, and no specific reaction tendencies, but only the capability of being conditioned. It is in this connection that Watson made the following much-quoted statement:

"Give me a dozen healthy infants, well formed, and my own special world to bring them up in, and I'll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant-chief, and yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors."¹

The complicated activities of the adult are built up on a basis partly of maturation and partly of conditioning. Three kinds of emotional responses—fear, rage, and love—are innate; all others are derived by conditioning. All motor skills are "manual habits." Thinking is admitted into the behaviorist's scheme of things by considering it "laryngeal habit." The infant's random vocalization in time develops into language. In the small child, laryngeal responses are always overt; that is, the child asks any question he thinks of, or makes any remark he chooses. By a process of conditioning, words are acquired by which the individual can manipulate his environment without making the corresponding overt movements. Thinking is thus merely a series of implicit verbal responses, or sub-vocal talking, open to study and measurement by objective means, and as such can be included in a behavioristic conception. Only two classes of reactions regularly lack verbalization: emotional responses, and the behavior of infancy before the acquisition of language. The "unverbalized" of Watson's terminology is similar to Freud's "unconscious," although Watson would repudiate the mystical implications of the Freudian concept.

Behaviorism has to its credit a number of rather fun-

¹ Watson, J. B., *Behaviorism*, p. 82, W. W. Norton, 1925.

damental accomplishments: (1) The chief line of its influence has been that growing out of insistence on objective approaches to psychological problems. That insistence has altered the very problems undertaken by psychologists. Most investigations now are typically objective. Introspection is less likely to be presented without at least objective support than was the case twenty years ago, before Watson made his demand for objectivity. (2) By explaining the development of personality as a process of conditioning, behaviorism has offered a hope of bettering humanity by presenting the proper environment for development. This phase has awakened wide attention and figured in sociological theories, sermons, and editorials. (3) Moreover, behaviorism from the first was a "youth movement," attracting the attention of numerous young psychologists and stimulating them by its program to enthusiastic investigation by objective methods.

Behaviorism is justly criticized (1) as having unnecessarily limited the field of psychology. Objective methods could have been applied without denying the existence of consciousness altogether. Perception, imagery, and thought have received practically no attention from behaviorists. (2) The behaviorists have emphasized method above all, yet have contributed no new method. Objective investigations had been made in psychological laboratories for many years before behaviorism. Furthermore, the conditioned reflex, of so much aid and comfort to the behaviorists, was borrowed from the Russian physiologists. (3) The behaviorists have not contributed many particularly fundamental discoveries. In recent years, less and less is heard of behaviorism. As the objective methods which it militantly upheld are adopted

into the general body of psychology, there is no longer necessity for agitating for objectivity, and behaviorism is losing its identity.

Gestalt psychology. Gestalt psychology, like behaviorism, came as a revolt against the established order in psychology in about 1912. Although behaviorism rebelled against the restrictions imposed by Titchener's psychology in the United States, and Gestalt psychology had its origin in Germany, both were objecting to the Wundtian tradition in psychology. The Gestalt point of view, like behaviorism, has wide application and acceptance outside the field of psychology, although behaviorism is applicable primarily to the social sciences, and the Gestalt conception to all science. But as systems of psychology they are about as different as possible. Behaviorism stresses investigation of behavior by objective methods, and rules out both consciousness and introspection. Gestalt psychology so far has emphasized perception rather than action, and uses both introspective and objective means of investigation. Behaviorism starts with reflex arcs and muscular contractions as units, and by conditioning, builds up the complex personality. Gestalt psychology approves neither of analysis as a method nor of elements as the fundamental basis of mental life, but maintains that experience presents itself in the form of unified wholes, not as elements derived by analysis. The program of Gestalt psychology is to study the properties of wholes.

The Gestalt point of view had its origin in an attempt to explain a phenomenon observed by Wertheimer, Koffka, and Köhler. When two lines are exposed successively at a determined optimum rate and intervening distance, the observer sees not two lines, but a single line

moving from the position of the first to that of the second. There is no movement in the external object—only two lines, discrete in time and space—yet the observer sees movement. Wertheimer found in the psychology of the day no explanation for this phenomenon, which he termed the “phi phenomenon.” The explanation that he worked out to account for it and many other common cases of perception demanded a complete revision of ways of perceiving and modes of thought.

Experience is not given as a collection of elements, but has a character of totality—a form, or Gestalt—which is destroyed if an attempt is made to analyze it. To make elements the starting point, or to analyze experience, is wrong. Psychology must go back to naïve perceptions “undebauched by learning,” avoiding “hard introspective labor” and steering clear of training in introspection. When a common-sense attitude is taken, one finds in experience unified wholes; not sensory patterns of brightness and color, but meaningful objects, such as tables, trees, and fences. Thus in its purpose, to find and study the properties of wholes, as well as in its method, observation without analysis, Gestalt psychology runs counter to Wundtian tradition.

That even creatures as lacking in intelligence as hens tend to perceive in terms of organized wholes was demonstrated by an experiment performed by Köhler. Grain was scattered on two shades of gray paper. When the hens took grain from the darker paper they were allowed to swallow it; when they tried to peck from the lighter gray they were driven away. The position of the papers was changed frequently so that sometimes the dark gray was on the right, sometimes on the left. After numerous trials the hens learned to attempt to peck only from the

darker gray. This training was merely preliminary to the major experiment. Grain was again scattered on paper of two shades of gray, but the gray that had been the darker in the training series was the lighter in the test series. If the hens pecked at this gray, they would be reacting to a specific degree of brightness. If they pecked at the darker paper, they would be reacting to the situation as a whole, to relative brightness. The hens showed a decided tendency to take food from the new darker gray, not from the specific gray reacted to in the training series. Even a hen responds to configurations or patterns.

In the perceptual field, Gestalt psychology calls attention to the relation between figure and background. The figure appears more solid than the ground; it has form and stands out. Typical Gestalt investigations study conditions of perception determining figure and ground, as illustrated by designs in which figure and ground are reversible. In the field of learning, insight is thought of as a Gestalt—a patterning of the field of perception in such a way that relevant factors are evident. On the physiological side, too, there are Gestalten, or configurations. Gestalt psychologists conceive of nervous action in the brain in terms of dynamical interaction or of mass action, a theory borne out by the researches of Lashley, a behaviorist.

Gestalt psychology finds many examples of organized wholes, each of which is more than the sum of its parts. The total process controls the response to separate items of the situation. Study of facial expression by models in which many different eyes, noses, mouths, brows, and chins may be fitted shows conclusively that the whole determines perception of the parts. The apparent expression of a part of the face changes when the remainder

of the face is altered with no change in that part. The human organism is a Gestalt; a melody is a Gestalt, or has a form quality of its own. It can be transposed from one key to another, using a different set of notes, yet the tune is still easily recognized. In foetal development, general movements of the body precede more precise movements, disproving the view that complex acts develop out of smaller, simpler ones, and illustrating the Gestalt point of view.

Of all the schools of psychology, the Gestalt school has probably stimulated a greater amount of careful experimentation, and is at present more active than any other. While several of the others are dying out, the Gestalt idea is steadily gaining acceptance. In the twenty-five years since its origin, it has made these notable contributions to psychology: (1) The fact that learning may take place through insight has been demonstrated and accepted by psychologists as a group. (2) Patterning in perception, seeing the situation as a whole, has been proved for human beings, animals, and fowls. (3) The problem of figure and ground, which Gestalt psychology emphasized, had hitherto received little attention. The Gestalt viewpoint has proved useful in physics and biology as well as in psychology.

Most of the following criticisms of Gestalt concern the lack of clarity of the concepts rather than method or results obtained: (1) The concept of Gestalt is not clear. (2) The theory of dynamical action of the nervous system is also vague. (3) The difference between analyzing a situation into its elements and breaking up a whole into smaller wholes is not at once evident.

Psychoanalysis. Unlike existentialism, behaviorism, and the Gestalt point of view, which originated in aca-

demie psychology, psychoanalysis had its origin in medical practice. It started as a movement in psychiatry in revolt against the physiogenic viewpoint that posits only physical causes for mental disturbances. As a reaction against this point of view, a few psychiatrists, convinced that in some mental disorders brain lesions are not to be found, sought the source of the symptoms in faulty habits of thought and action and in emotional maladjustments. Psychoanalysis had as its goal the cure of maladjustments, particularly of the neuroses. Its purpose was therefore intensely practical, and not academic in any sense. Although psychoanalysis started as a technique in psychiatry, by 1900 it had become a psychological theory as well. While psychoanalysis is commonly regarded as a definite point of view or school of psychology, it actually is not on a par with the other schools. Its origin in psychiatry rather than in academic psychology is one point of difference; but the most important distinction is the unscientific nature of the claims, postulates, and methods of psychoanalysis. It does not aim to be science, and in fact its theories and practices are far removed from the control of conditions and the careful checking of hypotheses characteristic of science. It is possible that psychoanalysis should logically be classified as a branch of parapsychology, related to or allied to psychology, but not actually psychology. However, since it is customary to include psychoanalysis in an account of psychological schools, it is admitted here with reservations.

The psychoanalytic theory was originated by Sigmund Freud (1856—), a Jew, reared and educated in Vienna. He studied medicine, worked in the physiological laboratory for six years, and then turned to medical practice,

for which he made further preparation by study under Charcot in Paris. The most significant thing Freud brought back from his sojourn in Paris was a remark he heard Charcot make—that in all cases of neurosis there is some difficulty in the individual's sex life, "always, always," if one only probes deeply enough. Freud pondered this remark, wondering why Charcot did not use the fact in his theory and treatment.

After his return from study abroad, Freud was associated with another Viennese physician from whom he gained suggestions which were later to culminate in psychoanalysis. Breuer had a woman patient suffering from hysteria, whom he was treating by hypnosis, as was his custom. She reported that she felt better after having been hypnotized and allowed to "talk out" her emotional difficulties. Use of hypnosis and the "talking out" method finally cured her. Breuer and Freud tried this method on other patients with considerable success. They soon found that hypnosis was unnecessary, that the talking out method alone could get at the hidden source of the maladjustment.

On the basis of sex as a cause and talking out as a method, Freud's psychoanalytic technique developed. In Freud's own words, psychoanalysis is an "attempt to trace back the morbid symptoms of a neurotic to their source in his life-history." Three methods are used in the attempt to uncover the hidden sources of the symptoms: the talking out or free association method, the analysis of dreams, and analysis of slips of tongue, pen, or memory in everyday life. In the free association method, the patient, reclining comfortably on a couch, is urged to think about his troubles and their causes, and to say aloud everything that comes into his mind regardless of how

trivial or embarrassing it may seem. All brakes are to be off, and no censorship over memories is to be exerted. Analysis of dreams gives additional insight into the causes of the neurotic symptoms. Only the analyst is competent to explain the real significance of the dream, for each item in the dream as the dreamer remembers it is but a symbol of a hidden meaning. It is the task of the analyst to interpret the symbolism and thus throw light on the suppressed mental content.

Slips of tongue or pen, or unintentional acts in everyday life are to the analyst far from mere accidents. The wife who plays with her wedding ring, taking it off and putting it on again, is consciously or unconsciously entertaining the idea of obtaining a divorce. The umbrella left behind at the home of a friend is not forgotten by accident, but affords an excuse for a return visit. All action is motivated, though often the individual is not aware of his own motives.

In the course of analysis, two facts always become evident: the facts of resistance and of transference. Resistance is seen when the patient refuses to be completely frank with the analyst. At a certain point he becomes either unable or unwilling to go on; unwilling to proceed because he has come upon something emotionally too upsetting to face; unable to continue because his mind is blank. Resistance is interpreted by the analyst as an indication that the analysis is proceeding in the right direction—that a hidden source of conflict is being touched upon, and that the analysis must continue in the direction indicated.

Transference, although at first glance a difficulty in the way of analysis, likewise became an important part of the theory. During the course of the prolonged, intimate

conversations essential to the treatment, the patient develops a strong emotional attachment to the analyst, either one of devotion and love, or hatred and resentment. Freud interpreted the appearance of this emotion as a transference to the analyst of the emotion stirred up from the hidden sexual complexes of the patient. Transference became an important part of the cure. It was the task of the physician to detach the transferred emotion from himself and to redirect it into more appropriate channels, and thus help the patient to become emotionally independent.

The actual pillars upon which the edifice of Freudian psychoanalysis rests are the theories of repression into the unconscious, and of infantile sexuality. Psychoanalysis lays great stress upon the importance of repression, the importance of sexual desires (the libido), and the period of infancy. According to the theory of repression, an unpleasant experience or a wish contrary to the dictates of conscience is not forgotten, or allowed passively to slip from consciousness as do unimportant experiences, but is forcibly thrust out of consciousness and kept out by violence. The imprisoned energy of the repressed desire finds an outlet in the neurotic symptoms. It is the task of the analyst to bring the repressed complex of emotions out of the unconscious back to consciousness, and to allow the emotion to work itself out in transference.

Early in his practice, Freud had become convinced of the sexual basis of the neuroses. In spite of the unpopularity and even ostracism resulting from the open declaration of his views regarding sex, Freud continued his analyses, constantly finding what he interpreted to be more and more evidence of the sexual nature of repressed emotions. Finally he became convinced that sexual strivings

(libido) are powerful forces long before sexual maturity, appearing even in infancy. Thumb sucking, love of being stroked and patted, showing off, and affection are all sexual manifestations according to Freud. The baby boy, in love with his mother from the cradle because of the pleasure derived from nursing, regards his father as a rival because the latter also has claims on the mother. Thus develops the Oedipus complex, the boy loving his mother and hating his father.

While there is much in the psychoanalytic theory which cannot be tested or proved as science proves its hypotheses, psychoanalysis has made a number of contributions of lasting importance to psychological theory: (1) Attracting attention to the universality and importance of unconscious motivation is one of Freud's chief contributions to modern thought. Regarding all conduct as motivated, at once offers a dynamic view of life and explains hitherto unintelligible behavior manifestations. (2) It emphasizes the importance of emotions in causing mental maladjustments, showing that the neurosis does not come from without, but that the symptoms arise from the individual's awkward attempts to effect an adjustment between his own desires and the conditions of his life. (3) It shows that the patient himself must discard his poor adjustment, aided by the analyst. (4) It emphasized the importance of sex in an era when rational consideration of personal problems was taboo. (5) Modifications of psychoanalytic techniques have proved valuable in child-guidance clinics and other organizations in attempting to adjust behavior difficulties and prevent the development of neuroses.

A number of fundamental criticisms have been made

of psychoanalysis: (1) Its theories cannot be proved nor its practices standardized. It must be accepted, if at all, on the basis of its accomplishments and of faith in its postulates; it cannot be verified by scientific methods. (2) It ignores the fact that some experiences are not repressed into the unconscious, but are really forgotten. (3) It overemphasizes sex.

Other psychoanalysts, as well as psychologists completely outside the boundaries of psychoanalysis, early felt that Freud stressed sex too much and ignored other life forces that probably are as fundamental as sex. Alfred Adler, of Vienna, at first an enthusiastic supporter of Freud, in 1912 broke away and started a rival school called Individual Psychology. Adler believed that feelings of inferiority are the fundamental facts in neuroses; that the individual, finding his urge for power or superiority threatened by inferiority feelings, "compensates" as best he can. He may attain superiority in the very field in which his weakness lies, or may compensate by achievement in some field far removed from the weakness. The problem of psychoanalysis, as Adler sees it, is to discover the goal of superiority that the individual has set for himself; to show him clearly what he is trying to do; and to aid him to develop forms of conduct more acceptable socially. Adler is in agreement with Freud in regard to emphasis on childhood.

C. G. Jung, of Zurich, is another psychoanalyst who disapproved of Freud's emphasis on sex and started the rival school of Analytic Psychology. Jung stresses the present difficulty of adjustment as the real cause of a neurosis rather than seeking its beginnings in early childhood. He retains dream analysis as a method of approach, but re-

gards dreams as merely indicative of unconscious attitudes toward present problems, helpful in enabling the individual to understand his difficulties.

Freud had explained adjustment problems as due to repressed sex desires; Adler considered them as due to thwarting of the urge to attain superiority. Jung to some extent reconciled these divergent points of view in pointing out that one person may be motivated by sex, and another by the will for power. The former has his attention focused on the love object; the latter on the self. Jung thus described two types of individual, the one whose interests and attention are directed outward toward the environment, and the one whose interests are directed inward and center on himself. The former Jung called the extrovert; the latter the introvert. None of Jung's other theories has stirred so much general interest as this theory of introversion and extroversion.

Advantages and disadvantages of schools of psychology. Varying points of view have been extremely valuable in the development of psychology in the last few decades; their value lies partly in the formulation of hypotheses to be tested, and partly in the energetic attack by partisan adherents to some one point of view on problems fundamental to psychology. A wealth of careful investigations has grown out of efforts of Gestalt psychologists to give convincing evidence of the fundamental nature of configurations; of behaviorists to prove the importance of conditioning in early childhood. Competition has kept adherents of the various schools alert, "on their toes," working indefatigably for evidence to support their hypotheses. And each new fact discovered has been an addition to the general body of psychological knowledge.

Each school has contributed to psychology by stressing something that demanded emphasis. The Freudians urge the tremendous importance of the libido; Adler and his followers stress the urge to power as an all-compelling motive; Gestalt psychologists hold the patterning observed in perception to be the ultimate value; and the behaviorists stress muscular and glandular responses. Each school has a one-sided view, but each contributes something of permanent value.

There are disadvantages as well as advantages in the numerous contemporary schools of psychology. The limited view taken by partisans of a school is one of its chief weaknesses. Another weakness is a tendency to dogmatic generalizations of a sort not permitting testing, as for example a predilection for one method or type of study, and dislike for another. Many of the assertions of the psychoanalysts are of this nature, as is the prejudice of the behaviorist against introspection and that of the configurationist against analysis as a method in psychology. As long as disagreements among schools concern matters of fact, careful experimentation should present evidence acceptable to all, but when they are in disagreement as to interpretation, relative emphasis, or philosophical doctrine, they appear irreconcilable.

Psychologists as a group, however, are not in constant discord and acrimonious dispute, but in general are in agreement as to fundamental methods, facts, and theories underlying the science in which all are interested. About fifty journals of psychology are being published, most of them concerned with research. An International Congress on Psychology holds frequent meetings, and the American Psychological Association holds annual meetings where new contributions and new theories are offered

in the same spirit as that in which other scientists offer their findings.

The majority of psychologists are not affiliated with any particular school, but select the best from each point of view. Of the forty-three eminent psychologists who have been elected president of the American Psychological Association since its formation in 1892, only about six have been adherents of one or another of the schools of psychology. The remainder have been leaders primarily because of their accomplishments in research rather than because they were affiliated with a school of thought or had defined general aims or methods of psychology.

Material formerly belonging exclusively to one school is gradually finding its way into the general body of psychology and becoming the property of all. Recent textbooks discuss repression and dream analysis along with presentations of the fundamental importance of goal-seeking. Explanations of learning by insight, by trial and error, and by the conditioned-reflex mechanism exist side by side. A harmonizing process is at work, adopting into the central science of psychology what it needs, strengthening "psychology" at the expense of the "schools."

Suggested References

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CHAPTER III

Pseudopsychology and Parapsychology

THE TITLE AND contents of this chapter require explanation and perhaps justification, since an agglomeration of subjects is to be included in it. Perhaps some are genuinely and properly in the field of scientific psychology, some certainly are not, though popularly supposed to be, and some are of very doubtful standing on any basis. But since they all seem to demand a place in the general discussion of fields or aspects of psychology, they are arbitrarily placed together in this chapter. The term pseudopsychology is applied to those subjects popularly but erroneously supposed to belong in the field of psychology, such as physiognomy and phrenology, and the term parapsychology to those that are related to, or "beside" psychology, such as telepathy and clairvoyance. By some scientists the latter are dismissed as nonsense or chicanery without the formality of investigation, and by others they are fully accepted; but since most scientists are beginning to feel that they at least merit examination, they are considered worthy of space here.

Pseudopsychology

Let us begin with pseudopsychology, since it is the field regarding which scientists are most in agreement. One of its projects is the analysis of character. This is ac-

complished by studying either the appearance or the automatic behavior of the individual. Appearance and conduct indicative of character are examined by several types of pseudoscience: phrenology, physiognomy, palmistry, and graphology, as well as observation of gait and bearing.

Phrenology holds that the conformation of the skull indicates the presence of certain mental faculties, or lack of them, located here or there on the brain cortex. A large amount of any given trait would be revealed by a protuberance on the skull, and a lack by an indentation. This theory was worked out in detail about 1800 by Gall, who made a chart showing exactly where each of about thirty traits was to be found. Many psychologists agree with Gall in his major premise, that certain functions are localized in specific brain areas; vision in the occipital lobe, hearing in the temporal, and so on; but not with his theory that the contours of the skull conform in their detail to the presence or absence of any given characteristic. The phrenologist examines the head of the person offering himself for inspection, and tells him what his traits are, ordinarily giving so vague an analysis that anything can be read into it.

Physiognomy is the reading of character from general appearance, mainly from the face. It posits that character is revealed by the set of one's ears, whether high or low, their shape and size, the form of the chin, whether receding or not, and so on with each of the features. This type of analysis goes as far back as Aristotle, and was in casual use even before him. The strictly acquired lineaments of one's face, such as wrinkles due to frowning, sulking, smiling, or squinting, frequently are indicative of character, but the natural slant of one's eyebrows, or

shape of the teeth or nose seems to have very little direct connection with character.

Palmistry is in the same general category. The lines of the palm bear no relation to one's past, present, or future, or to one's character. Like the face, the hand gives some indication of the ways in which it has been used, showing hard work, perhaps, rather than a life free from manual labor. However, some palmists, as well as physiognomists and phrenologists, do actually give facts about an individual, often a surprisingly large number of them, that were supposed to be completely secret, or at least in no way accessible to the analyst. A clever character analyst can find out merely by shrewd observation a good many facts about a person; and by judicious guessing can add a good many more. Furthermore, the person being analyzed unwittingly and unintentionally gives a good bit of information about himself. Of course all of this is entirely apart from the analyst's having available and utilizing all sorts of unsuspected sources of information about possible clients. Some unusually friendly filling-station operator or grocer's clerk may be a secret advance agent of the analyst, and upon the latter's arrival have a good file of facts about the people of the community and their relatives; weddings, funerals, sicknesses, losses, and so on. That, of course, is not psychology, but it explains many of the cases that the palmist "just *couldn't* have known anything about."

Observation of gait and posture is likewise of extremely limited value in character analysis. It is likely that a person with a brisk, business-like manner is on the average less indolent and lazy than one with a slovenly carriage. But some people with slow, inelastic movements keep plowing right ahead and accomplish much more in

a few hours than some whose busy, bustling air may be a cloak worn just for appearance, to cover the fact that nothing is being done. Activity does in a limited way reveal character, but the professional analyst can make no more of it than can any ordinarily careful observer.

Graphology, the judging of character from handwriting, likewise contributes very little of scientific value. In the hands of an occasional expert, judgments better than mere guessing have occurred; but there is more pretense than reality in most of the claims made for it. Pessimism is indicated no oftener than optimism by lines that run downhill; neither is undue loquacity or generosity revealed by "open" a's, o's, or d's. Any careful observer can usually distinguish a woman's writing from that of a man, and that of an uneducated person from an educated one, but it has not been demonstrated effectively that personality traits or characteristics are manifested in penmanship.

Perhaps in this connection mention should be made briefly of judging character from photographs. It is evident that if character cannot be judged from seeing the person, it certainly cannot from seeing a picture of him, especially with the present studio practice of erasing from the picture almost every trace of individuality. One might just as well try to guess an individual's traits from merely seeing his name written on a card.

Another "gold brick" about as valuable as character analysis is the much advertised "improvement" course. If only one could surprise his comrades by speaking French fluently to the waiter; or by gracefully quoting appropriate bits from the classics, or giving out information on any and all occasions, how happy he would be! (And incidentally, how his associates would detest him

for a pompous bore.) Or perhaps an individual would like to "improve the memory" by taking this or that course. To be sure, everyone does need to improve himself, but there are no known short-cuts to grace and culture. They are not things to be plastered on from without, but matters of constant and diligent endeavor, unless one is so extraordinarily fortunate in his biological and social heredity that he already has poise, a good memory, and all the other offered improvements.

Even less sound from the scientific viewpoint than characterology is the matter of prediction of future events. It really has no place in psychology, but is so often linked up with pseudopsychological performances, and so frequently practiced by the same persons, especially palmists, that it deserves a little attention here. The future may ostensibly be told by means of reading the palm, tea leaves, cards, or the stars; by gazing into a crystal, or by going into a trance and just seeing the event transpire as though before one's eyes. The prophet, or more likely the prophetess, can also interpret one's dreams, and thus reveal the future. Science takes no stock in any of that, and has no reason to do so. It is carried on almost exclusively by charlatans, though it is true that some who practice it do actually believe in it. Although the mental caliber and educational achievements of any given seer are not necessarily inferior, a practice that is demonstrably backed exclusively by either fraud or ignorance does not commend itself highly to intelligent people. One reason so many people lean toward belief is that such predictions do actually come true at times. It would be strange if the predicted death or illness or good fortune never did come true. But a reason of more weight is that people *want* to believe in it. People greatly enjoy the mysterious

and occult, and since there seems to be no other method by which one can so rapidly arrive at knowledge of the future, they use it. Here again a short-cut is desired rather than the normal route.

Parapsychology

Parapsychology has received much less scientific attention than has pseudopsychology. This has been partly due to the fact that all the activities of the latter are comparatively easy to investigate under controlled experimental conditions; the degree of truth and falsity in each claim made is measurable. Except in connection with prediction of future events, nothing occult or supernatural is posited for any of them. On the other hand, experiments in the fields of parapsychology are frequently difficult to carry out because the occult is so often invoked as the basis for the phenomena under investigation. That is especially true of spiritualism in all its aspects. However, other branches of parapsychology, such as dowsing, telepathy, and clairvoyance, while they are often explained on supernatural grounds, can be approached and studied by ordinary laboratory techniques.

Spiritualism, with its varied manifestations and activities, has had a long and in some respects venerable history. Communication with spirits of the dead was accepted as a matter of course by all classes a few centuries ago. It was usually resorted to, however, as a source of wisdom and information, rather than, as in its present use, for commercial and social purposes, or to ameliorate loneliness.

Communication with spirits has as yet inspired very little credence among scientists in general, though a few

have given much attention to it, and seem convinced of the genuineness of spirit manifestations. Sir Oliver Lodge, the most typical of these, is one of a very active group of competent and intelligent people, most of them with a background of scientific training, composing the Society for Psychical Research, founded in 1882. This is a British organization with an American branch, having as its purpose the investigation of every sort of real or apparent psychic phenomenon that seems to defy or transcend the laws of the natural world. Originally these events were considered explicable only on supernatural grounds, but now science is insisting that they either be explained on some acceptable scientific basis, or be discarded as the product of superstition, wishful thinking, or fraud.

Present-day investigators have found so far only one exception to the otherwise universal faking in connection with spirit contacts. The one exception is that of Madame Piper, investigated by a group including William James and G. Stanley Hall. She may or may not have been a fraud, but in any case was not discovered in any intentional deceit. She died before the experiment was at all completed.

The tricks practiced in spiritualistic seances are very extensive in variety and admirable in ingenuity and execution. In fact, the average performer bewilders the usual group of spectators and convinces a large share of them that the phenomena he presents are what they purport to be. An outstandingly clever performer can outwit any intelligent group of investigators unless it includes a skillful professional magician who recognizes the tricks of the trade and knows better what to look for than could an ordinary scientist in the academic field. Hou-

dini, the master magician of his time, found no trick done by so-called spiritualists that he could not better.

Their claims, all of which upon investigation have been found fraudulent, are numerous, varied, and intensely interesting to the average person. As has been said, people enjoy being mystified; and furthermore, they want to be convinced of immortality both for themselves and for their dear ones. Hence they are easy to deceive, especially if uninformed about the manifold tricks that are possible; moreover, as the seance ordinarily takes place in semidarkness, detection of trickery is even more difficult.

In a seance, as a rule, a medium claims to go into a trance and let his mind or spirit be displaced by one from the other world, thus allowing his body, especially the vocal organs, to be used by the invading spirit. The client or patron of the medium can then converse with the spirit, perhaps of his deceased wife, and feel that he has proved her continued existence. Photographs may even be taken of the beloved spirit, possibly looking over the shoulder of the medium. Or the spirit may actually materialize in fully visible and tangible form. A filmy, ethereal, "spiritual" substance, called ectoplasm, may be exuded from the medium's person, from his mouth or ears, for example, and can be drawn in at will.

Of all this, the only veridical act is that of going into a trance; and ordinarily even that is not authentic, but exactly on a par with the photographs, which are the proved result of double exposure or other tricks; and ectoplasm, which turns out to be gauze. However, there are those who can enter the trance state more or less at will. Some of them are genuinely convinced of the soundness of their claims as mediums. Probably Madame Pi-

per was. But their performances can ordinarily be fully explained on the principle of suggestion, and hence are no more occult than are those of tricksters. When it is suggested that Elijah, or the client's departed wife or grandparent, be "summoned," the medium, if faking, very naturally and logically plays the part as well as possible. On the other hand, if the trance is genuine, the individual is in a highly suggestible state, similar to that when under hypnosis, and hence acts freely on any suggestion given him.

In some of the cases investigated by science, the medium is not faking in the least, but is merely a supple and innocent tool in the hands of a clever manager. But even if the medium is honest, and really goes into a trance, there is no evidence of any weight whatever that he is a medium for spirits. The trance state is not yet explained to the full satisfaction of psychology; it is probably a condition of dissociation, induced by autosuggestion. There is room for careful study on the subject still. But research has no question as to ectoplasm, spirit photographs, and other such phenomena; they are tricks, pure and simple. This does not imply that communication with spirits is a settled issue, but there is no positive evidence for it in scientific research, and what passes for it in vaudeville circuits and elsewhere is just another mystifying trick.

A notorious illustration typical of current spiritualistic phenomena was the performance of Margery, the wife of a Boston surgeon, Dr. Crandon. She claimed that the spirit of her deceased brother, Walter, displaced her spirit at times, and could perform various sorts of supernatural feats, such as production of voices and movement of objects at a distance without the aid of any physical equipment whatever. The case was investigated by competent

groups, including such psychologists as Boring and McDougall, and such magicians as Houdini and Code. Since not only were the psychologists convinced that it was trickery, but the magicians could "out-Margery" her on every point, it seemed unnecessary to invoke the occult as an explanation. The investigators found that when they insisted on control of part of her body, such as her hands, she had to have her legs free, whereas she had claimed that "Walter" needed no physical means for his performance; he used telekinesis, that is, movement of objects at a distance without contact of any description. When she did finally consent to let them control her movements by placing luminous bands about her wrists and ankles, making them visible in the darkness and hence revealing their location at all times, she had the bands so loose that she could slip out of them. If they bound her hands or feet with wires attached to nearby objects, she required the wires so slack as to allow ten inches free play in any direction.

A frequent trick not depended upon by Margery is for the medium to wear slippers or mules with metal tips, so that the person guarding the medium's feet by keeping his feet on hers will not realize that she has slipped her foot out, and with it is picking fruit out of a basket, or ringing a bell eight feet away (by placing her foot on a nearby electric button). Of course, the tricks are varied from time to time by any clever performer, both to mystify the patrons more, and also to make it more difficult for them to "catch on." And the tricks are legion. Naturally the biggest asset to the trickster and the greatest obstacle to the investigator is the factor of darkness.

Another form of spiritualistic phenomenon is known as *levitation*. By this is usually meant the rising of a per-

son or object into the air without any type of physical support. The person or thing just "floats." There are a few careful students, one of them a recent winner of the Nobel Prize for work in science, who believe it possible. But no experiment has been devised that can produce it, and the alleged cases have been proved false if investigated. Houdini's "levitation" exploits far outdid those of even the best spiritualists.

Somewhat allied to spiritualism are dowsing, telepathy, and clairvoyance, which seem to depend on some sort of extrasensory stimulation and perception. Like spiritualism, they have, as a rule, been explained on grounds that conflict with our present systems of scientific beliefs, and have been considered exceptions to natural law.

For some years the attitude of the learned toward *dowsing*, or "well-witching" (the discovering of water or of valuable ores by means of a hazel twig or other divining rod), was one of complete and scornful denial. The dowser is supposedly able to locate underground water or minerals in totally unfamiliar territory by the use of a forked hazel twig, which, twisting forcibly in his hands, reveals the spot where a boring should be made. Of late years the matter has been reopened, and an attempt is being made to approach the study of the facts of the case from a scientific viewpoint. One difficulty in making an adequate investigation of dowsing is that while people are to be found who are convinced that a parent or a neighbor had the divining gift, and who testify that a community was accustomed to depend on this individual to locate its sources of well water, it is hard to find anyone now, remote from pioneer days, who makes the claim for himself. Experiments have shown that some who claimed the gift did actually locate such sources to an extent

greater than mere chance or guessing would allow. One possible explanation is that the dowser is responding to subliminal stimulation, that is, to stimuli too faint to be consciously noticed. The source of the stimulation may be in unconsciously observed features of the terrain, or of the involuntary expression of a companion, if the dowser is accompanied by an individual who knows the region in regard to the details under investigation. This occurred in an experiment in which a "water-witch" was escorted over a campus by the engineer, who of course knew the location of the water pipes. The problem is not fully solved, however. It is one of minor importance and interest; were it not for the claim that the rod operates only in the hands of a certain type of person, it would be of no psychological significance whatever.

Telepathy and clairvoyance excite widespread interest, both popular and scientific. They lend themselves better to laboratory experimentation than do any of the other forms of "psychic" manifestation, and there has been a greater amount of exact research regarding them than any of the others.—By *telepathy* is meant the transference of thought from one mind to another without the aid of any known sensation. —Only living human beings or animals are involved. By *clairvoyance* is meant the perception of objects without the use of sense organs. The object may be completely out of range, miles away; or at hand, but out of sight. It is assumed for experimental purposes that these phenomena involve nothing in the nature of the occult. An effort is being made to study them under controlled conditions and to get accurate information concerning them. Science is trying to discover, first, whether or not they really do occur, and whether such abilities are actually within the scope of

human or animal capacities, as is claimed by some reputable investigators; second, if they do exist, under what conditions they occur, and whether these conditions can be brought about at will and controlled; and third, how to explain them.

Some of the experimentation has been in the field of animal psychology, and includes observing and studying the performances of trained dogs and horses. An especially noteworthy and conspicuous instance of such performance was that of Clever Hans, a horse supposedly able to work simple problems in the four fundamental processes of arithmetic. He would be given some problem, such as $9 - 2$, and would tap out the answer. The trainer and the owner were entirely honest in their opinion that the horse was capable of abstract thought and inner speech, and did not consciously help him in any of the solutions. His performance was so highly accurate and so apparently free from any outside influence that it baffled more than one able investigator. At last Pfungst, a German experimenter, suspected the source of the animal's accuracy, and on trying out his theory, found it confirmed. He discovered that some one in the group about the horse had to know the answer. It did not need to be the owner or the trainer. They could be absent and the horse would still respond correctly, but only if the experimenter knew the answer. That might seem, at first, to be a case of telepathy, but it was not. The questioner's attitude of relief, no matter how carefully controlled a "poker face" or posture was assumed, revealed to the animal when he had pawed a sufficient number of times. If Pfungst did not himself know the answer, as would be true when he held up cards with only the reverse visible to himself, and the problem toward Clever Hans,

the horse solved it only as often as chance would allow. But if Pfungst or one of the others knew the answer, Clever Hans would run up an accuracy as high as ninety-eight per cent. Of course it was a remarkable feat of perception, but it was only that. It was not direct transference from mind to mind, but merely an interpretation of slight, but visible, muscular reactions.

Some of the best recent work (1935) along the lines of human telepathy seems to be that at Duke University by J. B. and L. E. Rhine, with the co-operation of McDougall. Previous to their work, the most elaborate and painstaking experimentation was the admirable piece of research done by Coover at Stanford University. Its conclusions were negative on the whole, even the "psychics" failing to "guess" unperceived material much if any better than the laws of chance would allow. This was true not only of individuals who merely considered themselves more than ordinarily sensitive in psychic matters, but of a group of ten professional mediums of high reputation who genuinely believed in their own powers and welcomed the opportunity to demonstrate them. The professionals, in fact, were no better than individuals who made no claims whatever to being psychic. In connection with the report of their own experiment, Rhine reviewed the Stanford research and felt that had the latter been carried on a little further in the direction it was taking at its close, its conclusions would have been positive. Rhine's opinion is based on the fact that he found little evidence of telepathic powers until his subjects had made hundreds of trials. He points out that Coover's subjects were "guessing" more accurately toward the close of the experiment than at any earlier stage. Both groups of investigators made diligent effort to find psychic subjects;

that is, people who had had unusual and mystifying experiences of a psychic nature. The investigators were convinced that whether psychic or not, their subjects were wholly reliable and capable of intelligent co-operation. Of course, a study of that sort hinges absolutely on the integrity and competency of the experimenters and their subjects. Even a suspicion of trickery invalidates the whole thing.

Rhine used the following technique in his experiment. He had cards printed with five different designs: a circle, a rectangle, a star, a cross, and a set of wavy lines, and had numerous packs of twenty-five cards made up, each design occurring five times in every pack. In experiments involving telepathy, the experimenter sat completely out of sight of the subject, shuffled the cards, and concentrated on the designs one after another, and tried by effort of his mind to convey the information to the subject. The subject then called out or wrote the designs in the order in which he thought they were arranged. Since each subject was familiar with the designs on the cards, it was simply a question of his "guessing" the order they were in. The only difference when clairvoyance was being investigated was that neither the experimenter nor the subject knew the order in which the designs were arranged. The subject was to "perceive" which design was there, just by any mental effort possible to him. The experimenter checked afterward to determine the correspondence between the order in which the subject named the cards and the actual order. Rhine applies the term "extra-sensory perception" to either telepathic or clairvoyant means of obtaining information. A subject with one capacity was invariably found to have the other. Most of the work was done with a small number of students with

unusual ability and interest, and willing to devote countless hours to it. The greater part of the experimentation was carried on in the laboratory, but some of it was done by students when apart from one another, sometimes even in different towns.

The study is being very widely discussed, and is arousing much favorable as well as adverse criticism. Most critics have only commendation for the thoroughness of the investigation. There were 91,174 trials made. Determination of the reliability of the results involves extremely complicated statistical procedures. Rhine says that there is only one chance in 100,000,000,000,000 of the results of his investigation being obtainable by chance, or pure guessing, rather than by genuine telepathy or clairvoyance. According to the law of averages, an individual should make five correct guesses in each pack of twenty-five cards; whereas, under favorable conditions, the accuracy of Rhine's subjects was definitely greater. (Fatigue, disinclination, and sedatives operated unfavorably, and caffeine and inclination favorably.) Furthermore, when the subject tried to give a *wrong* response, he succeeded in doing so to a much greater extent than could be accounted for by chance. Some subjects, naturally, were consistently better than others, and all were better at some times than at others. On one occasion, a subject gave the correct order of an entire pack of twenty-five cards. The study challenges thought, but because the findings seem so much at variance with our usual dependable patterns of thought, it is difficult to accept them as final.

The usual explanation offered by psychologists of the positive evidence for transference is on the basis, not of extrasensory perception, but of subliminal stimulation.

The person receiving the transference usually is entirely honest in his belief that his sense organs are in no way responsible for the accuracy of his guess. He just "feels" that he should guess this way or that. But when under controlled conditions all possibility is removed that either the slightest sound or flicker of an eyelid may reach him and serve as a suggestion, the percentage of accuracy is ordinarily no higher than might be attributed to chance. Hence most careful and able investigators feel justified in regarding coincidence, mental habits, or subliminal stimulation, or all three, as sufficient to explain the more or less frequent cases of apparently telepathic communication. One dreams of a certain person, and the next morning receives a letter from him; or mentions some remote topic of conversation at the very instant his companion was opening his lips to speak of it. But if one were to take account of negative instances, the hundreds and thousands of times it does not happen, the occasional times it does occur could usually be accounted for on one of these bases.

Ever since the time of Sir William Crookes, the great physicist, who was one of the first to suggest such a solution, physical scientists have now and again offered as a possible explanation of telepathy a theory that vibratory waves from the agent's brain might be projected through space and be received by the percipient. Other physicists disagree with any theory which makes telepathy a physical phenomenon, asserting that a form of physical energy such as a "brain wave" cannot be transformed into psychological energy; they insist that telepathy, if genuine, is a psychological phenomenon. The writers are not equipped to support any opinion on the question. However, research on brain waves is now being carried on in numerous

laboratories, in Harvard, Berlin, Cambridge, and several others.¹ These researches have discovered patterns of brain activity which serve to differentiate individuals almost as clearly as do fingerprints. Two electrodes are placed against the individual's head, and connected with wires leading through amplifiers to an electromagnetic needle, which records on a moving tape all activities of the brain, whether awake or asleep. In the light of these results, might it not seem remotely conceivable that there is some connection between "brain waves" and subliminal stimulation or extrasensory perception?

To the layman, telepathy, clairvoyance, and similar topics are mysterious and utterly fascinating. They are surrounded by more popular superstition and misunderstanding than is the case with anything else in the field of psychology. But there is still serious question whether, if coincidence is ruled out, telepathy and clairvoyance actually exist other than in the practices of quacks and charlatans, and in the imaginations of honest people possibly subject to hallucinations.

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CHAPTER IV

Psychology in Medicine

IN THE EARLIEST times, cure of the body was in the hands of the priests or medicine men, who injected a strong religious flavor into the treatment. Among the Greeks, the art of healing was practiced primarily by the priests of Aesculapius, the god of healing, in whose honor about two hundred temples were erected. The sick who sought cure at the sanctuary were greeted by the priests, and put in the proper frame of mind by a recital of the deeds of Aesculapius, and by prediction of the inevitable success of the treatment. After appropriate religious ceremonies, the sufferers were put to sleep, probably by narcotics, in a hall near the temple. During sleep the god of healing was supposed to appear in a vision and to issue instructions for the treatment. These directions were interpreted by the priests, who then prescribed blood letting, catharsis, or whatever remedy was required. On departing, each patient so restored to health left a votive tablet recording his name, disease, and manner of cure, as well as offerings to the god. It is probable that the priests of Aesculapius had acquired considerable skill in medicine, and that the ceremonies at the temple were designed primarily to promote the reputation of the god. According to mythology, the skill of Aesculapius in healing and in restoring the dead to life caused Pluto to complain to Zeus that the population of Hades was being seriously reduced.

In anger Zeus slew Aesculapius with a thunderbolt, thus providing for a normal increase in the population of Hades, but dealing a terrific blow to the development of medicine.

Of all the professions, medicine was the first to sever connections with the priesthood. In the practical treatment of the patient, religious ceremonials were little by little abbreviated until they occupied a relatively small part in the healing process. Nevertheless, habit persisted, and the physician did not drop his priestly ways all at once. Aëtius, royal physician to Justinian, said that in preparing a plaster the physician should intone repeatedly, "The God of Abraham, the God of Isaac, the God of Jacob, give virtue to this medicament." In applying a bandage to a wound the physician was counseled to say, "Stop thou thy bleeding." Today, although little survives of the use of the healing proverbs except the cheerful comment of the modern doctor as he hands the prescription to the patient, "This will fix you up all right," physicians recognize the curative influence of mental states.

Mind-Body Relationship

The point of view taken on the age-old question of the relation of mind and body will largely determine procedures, or at least emphasis, in the treatment of disease. Can the organism be reduced to one substance or element? If so, is that substance mind, or is it matter? Or are mind and body merely different aspects of one common substance?

One extreme view, exemplified by Christian Science, denies the existence of matter, and affirms the universality of mind. All sickness is an error of the mind, to be cor-

rected by a system of mental treatment or faith cure, rather than by ordinary avenues of medical treatment of disease.

An opposite but equally one-sided view holds that matter is the sole reality. Mind, thoughts, and feelings are but "functions" of the brain and other bodily organs. Thoughts can in no way alter the physical changes taking place in the nerve cells; these changes are due entirely to antecedent physical processes. Application of this materialistic viewpoint is seen in medical treatment of the diseased organ by surgery or by drugs, with no attempt to treat the patient as a complicated personality with thoughts, feelings, and difficulties of adjustment beyond the scope of physical medication.

More practical from the standpoint of medicine is the view that the organism is a psychophysical unity in which mind and organic structure are indissolubly related. Mental activity is largely determined by physical functioning; and conversely, the mental state exerts a noticeable influence on the functioning of various bodily organs.

Effects of physical functioning on mental life. Instances in which abnormal bodily functioning affects mood and disposition have been forced on the attention of even the least observant. Fatigue, headache, and loss of sleep promote irritability and depression. Disease toxins and other abnormal physiological conditions produce prolonged effects on intellectual and emotional attitudes. Influenza is followed by apathy and depression, while a person with tuberculosis, even though seriously ill, is likely to be optimistic. Sleeping sickness is often followed a few months later by personality disturbances, making a previously normal child dull in mentality, irritable, and

often criminally inclined. A blow on the head or the bursting of a cerebral blood vessel produces immediate loss of consciousness.

Glandular functioning to a large extent determines both mental alertness and personality. When the blood-sugar level of the diabetic patient rises too high he becomes stuporous, but returns to consciousness when an injection of insulin lowers the sugar content of the blood. If the blood sugar is too much reduced by an excess of insulin, unconsciousness again results—unless hastily prevented by the taking of sugar. Consciousness itself thus depends on maintenance of the proper amount of sugar in the blood, as well as on numerous other physiological factors.

Drugs and diet likewise influence the character of mental life. A diet low in calcium but high in phosphorus promotes irritability, as does a diet deficient in magnesium. Pellagra, due to dietary deficiencies, reduces mental alertness. Numerous drugs produce stupor or coma, while others stimulate mental activity.

Every organ of the body exerts its influence on the activity of the nervous system, and thereby modifies mental life. Toxins from fatigue, disease, or from the use of drugs poison the nervous system no less than the muscles.

Effect of mental states on physical functioning. Mental states, particularly those with emotional coloring, in turn cause widespread somatic reverberations. Often symptoms of disease are produced as by-products of mental states. The resulting physical irregularity is often only temporary, but sometimes aggravates or even produces prolonged malfunctioning of some organ of the body.

(1) *Symptoms of disease produced as by-products of*

mental states. A simple laboratory experiment illustrates how thought can affect circulation. In this experiment the subject lies motionless on a perfectly balanced platform which resembles a see-saw. While lying there, he is instructed to solve some problems in "mental arithmetic," or to think intently on some topic. In a short time the end of the board on which his head rests is observed to descend slowly. Thinking has stimulated the flow of blood to the head, making it heavier and causing the board to tilt. Similarly, concentration of attention on any part of the body increases the flow of blood to that region, with consequent unusual sensations. It is easy to see how symptoms of indigestion, heart disease, ovarian tumor, or other conditions might be induced in suggestible persons by the very apprehension of the existence of the disorder.

Prolonged emotional excitement causes the thyroid to produce an oversecretion which may result in a chronic hyperthyroid condition. There is no doubt that mental and emotional stress may aggravate or even provoke diabetes, heart disease, apoplexy, and a host of other diseases. A well-known physician ascribes to worry the fact that mortality from gastric ulcer has increased twenty-five per cent during the depression.

(2) *The role of suggestion in the production of disease symptoms.* Suggestion often plays an important part in inducing or exaggerating symptoms of disorder. It is not a difficult task to make a person ill by suggesting to him that he looks tired, a little feverish, and so on. After a few suggestions he may take to his bed, and possibly remain there for some time, convinced that he is seriously sick. During a flu epidemic every tickle in the throat and every sneeze are magnified into incipient influenza.

In hypnosis, a state in which suggestibility is greatly heightened, suggestions of pain make a pin prick cause excruciating suffering, while suggestion that no pain will be felt makes possible painless surgical operations without an anesthetic.

(3) *Functional versus organic disorders.* The majority of disorders can be diagnosed by inspection of the patient and by laboratory tests, and the trouble can ordinarily be traced to a definite organic lesion or to a toxin in the blood stream. An inflamed appendix can be diagnosed and removed by surgery, the condition of the appendix proving the accuracy of the diagnosis. But sometimes a disorder such as blindness, paralysis, or mutism occurs in which there is no apparent organic cause for the trouble. The person is completely blind, for example, yet the eye reflexes are normal, and no defect in the visual apparatus or nervous system can be found. Such disorders, called "psychical" or "functional," are due to disturbance of functioning resulting from mental or emotional conflicts, and have no physical basis. Functional disturbances originating in suggestion are most characteristic of the hysteric type of personality. These disorders often closely resemble organic ones, and may not be recognized by the physician as psychic in origin. Functional disabilities may be identified by the following characteristics: (a) The onset of the condition is often of an unusual sort. Janet tells of a man who was struck on the face by a greasy rag, became blind, and remained so for four years. (b) The reflexes are normal, showing the neural mechanism to be intact. (c) Recovery may take place in an extraordinary manner. A woman who had been mute for many years yelled when stung by a bee and recovered her speech from that moment. Many of the

miraculous cures at shrines are cures of functional disorders. (d) Functional disorders are variable. The right arm may be paralyzed one week, the left foot the next, a shift that is obviously impossible in organic conditions.

Although there are no known organic causes for functional disorders, they do not occur without a cause; there is a definite purpose behind them. They serve as a solution of mental conflict, a solution unconsciously adopted by the individual. Losing the voice just before time to make a speech, fainting in a disturbing or difficult situation, or becoming ill may serve as means of avoiding the problem, and at the same time direct attention to the incapacity, rather than to the fact that the situation has not been met in a straightforward manner. The sudden affliction provides a temporary or permanent solution of the problem. A soldier in the trenches suddenly becomes blind in his sighting eye—and at once has an honorable excuse for leaving the trenches and being sent to a hospital miles behind the firing line.

During the World War, the term "shell shock" was applied to cases of disabling symptoms not caused by wounds, under the impression that the explosion of a shell in the vicinity was the causal factor. However, hundreds of similar instances occurred in training camps, thousands of miles from the nearest exploding shell. Continued study of the situation made it evident that cases of so-called shell shock represented merely the breakdown of a neurotic individual faced with an intolerable situation. Immediately after the signing of the Armistice, thousands of rapid cures of functional disorders occurred: the blind suddenly recovered sight; the lame walked; the mute spoke. Since the war was over, the source of the internal conflict was removed and recovery

became desirable, whereupon the disabling symptoms disappeared.

Similar functional disabilities are seen in men and women of all walks of life. A woman whose daughter is engaged falls seriously ill just before the wedding, causing the wedding day to be postponed. She recovers, and remains well until the daughter again sets a date for the wedding, whereupon the mother once more becomes ill. It is not difficult to guess that she does not approve of her daughter's marriage.

A phenomenon similar to shell shock has appeared during the recent economic depression. In this disorder the victim unconsciously magnifies some minor ailment, and develops an illness severe enough to disable him. To be unable to earn a living, and to be forced "on relief," appears as disgraceful and cowardly to the formerly self-sufficient, self-respecting worker as fleeing from the battle does to the soldier. But if one is too sick to work, there is no disgrace in avoiding a futile struggle with the economic depression. Relief agencies for years will probably be supporting many of the victims of "depression shock."

Psychology Applied in the Practice of Medicine

Relation of physician to patient. Through the years certain conventions have grown up governing the appearance and manner of the physician. The doctor today is seldom seen without his little black satchel, the modern badge of the physician. Young doctors who have more free time than patients can give the neighbors an impression of importance and efficiency by hastening hither and yon with a hurried air, the little black bag much in

evidence. The physician must look prosperous as well as busy, and may not drive a shabby or inexpensive car, neglect a haircut, or wear unpressed clothes. Nor is the traditional physician youthful in appearance, but mature and fatherly. This prejudice in favor of maturity sometimes leads the intern or young practitioner to cultivate a mustache to increase his apparent years.

Prestige plays an important part in the success of the treatment. The famous specialist aids the patient by his reputation, and by his exorbitant fee and all that it implies, as well as by the treatment he gives. Moreover, the physician impresses his knowledge upon the patient and his family when he diagnoses a common cold as a coryza, or infantile paralysis as poliomyelitis. The patient is also impressed by the physician's erudition when the latter diagnoses the case and describes the symptoms before the patient has mentioned them.

The bedside manner of the physician, as well as his popularity and the extent of his practice, determines considerably his success in healing the sick. The physician is expected to inspire confidence, to arouse an attitude of hope, and to appear calmly certain of the success of the treatment. This confidence is contagious, aids the patient, and assures the family that all is progressing satisfactorily. As Axel Munthé said, "There is no drug as powerful as hope." The successful physician must respond to the patient as a person, and see in him more than a stomach ulcer, a broken wrist, or an inflamed appendix. One type of patient wants to be told exactly what ails him, what treatment is being given, and why, and with what effect. Another would be better off if kept in ignorance of the true nature of the disorder, for if he recognized its seriousness he would worry so much as to

aggravate it. One man has a pain in his right side and ignores it; another man consults half a dozen specialists, makes his will, and is accompanied to the operating room by a priest. The doctor must recognize with which type of patient he is dealing, and govern himself accordingly. He also needs to estimate accurately the intelligence level of the patient and his ability to co-operate in the treatment.

It is not wise for the doctor to minimize the seriousness of the patient's condition, or to ridicule his fears or worries. The patient wants sympathy from his relatives and friends, and often obtains it in proportion to the seriousness of his illness. He wants to be recognized as really ill, but at the same time assured of recovery. The physician must not fail to give his patient a prescription, drugs, a diet list, a hypodermic injection, or some other tangible evidence of treatment. The patient may actually need only rest and time for recovery, but he wants medicine and active aid from the doctor. He will resent the bill more if he feels he has received nothing tangible. This is one reason for administering "bread pills" or medicines, the principal effect of which will be psychological.

Psychological factors are particularly important in making the diagnosis. The physician must bear in mind that high blood pressure, high metabolic rate, and sugar in the urine may be the result of nervousness at the examination in the doctor's office, and not a chronic condition. The symptoms and feelings that the patient reports are subjective, often not susceptible to objective test, and may be exaggerated. Sometimes essential facts that the physician needs to know in order to proceed intelligently may be suppressed by the patient. Obtaining a case history and getting the full co-operation of the patient are ex-

tremely important. Laboratory tests may offer a reliable basis for diagnosis of organic maladies, but a careful study of the history of the patient will in many cases best reveal the origin of ineffectual reaction patterns.

Psychological factors in treatment of disease. Although a broken bone, bacteria, and disease toxins cannot be directly influenced by psychological means, recovery even in these purely organic conditions is aided indirectly by suggestion. The patient who has confidence in his doctor, and who believes that his broken leg has been set correctly and is being well cared for, will rest more quietly, sleep better, and eat better than one harassed by doubts as to the competency of the physician. An attitude of hope and cheerfulness predisposes to recovery even in definitely organic ailments. But it is in the so-called functional disorders that psychological treatment is most effective, often resulting in complete recovery when no other methods yield the slightest success.

The most important methods of treatment by psychological means are suggestion, which includes both auto-suggestion and that given while the patient is in an hypnotic state; rest and diversion; re-education; and psychoanalysis.

Suggestion implies the uncritical acceptance of ideas aroused by the words, acts, or manner of another person, as well as the unquestioning performance of any act that one is directed to carry out. Numerous instances of the efficacy of suggestion in curing minor ailments have already been recounted. The patient who "feels better" immediately upon the arrival of the doctor, or as soon as the medicine has been swallowed, is responding primarily to suggestion. Changing the environment by a trip to the seashore may aid through suggestion; as may also the

administration of harmless and inert drugs, performance of sham operations, energetic massage, electrical treatments, even without current, hypodermic injections of sterile water, and other treatments given more for psychological than for physiological effect.

Christian Science affords many striking examples of how far suggestion and faith may aid the individual in preventing or curing disease. Banishment of worry, ignoring of slight ills, and maintenance of a serene attitude make a distinct prophylactic contribution to mental and consequently to physical health.

Impressive evidence of what may be accomplished by suggestion is seen in the remarkable cures at temples and religious shrines in all times and among all nations, by the "king's touch," when it was popularly believed to have curative power, and by Coué and his followers of the present day. Coué's system was primarily that of autosuggestion. The patient was admonished to repeat over and over to himself, with strong faith in its efficacy, the statement "Day by day, in every way, I am getting better and better." Many people were completely cured by the Coué method, and many more were greatly improved. Functional disorders respond readily to this treatment by autosuggestion, though organic conditions are aided only to the extent of producing a feeling of optimism and well-being. The illusion of improvement may be dangerous for a patient with an organic disease, such as cancer or an infected appendix, for the needed operation may be postponed until too late.

Suggestibility is greatly heightened in the hypnotic trance. For this reason physicians sometimes hypnotize their patients in order to make them accept curative suggestions very readily, and act on them. By means of dim

lights, monotonous talk, and suggestion, the field of attention of the hypnotized person is narrowed to exclude all sensory impressions not suggested by the hypnotist. By appropriate suggestions during the hypnotic trance, pain can be relieved or diminished so that a minor operation can be performed with no pain to the patient. In the middle of the nineteenth century, Esdaile performed painless surgical operations on 250 hypnotized Hindus. At about the same time Elliotson, in England, likewise performed operations on a number of patients, using hypnosis as the sole anesthetic. The use of hypnosis in surgery would probably have been widespread after these demonstrations, had not chemical anesthetics, which are more reliable and easier to administer, been perfected just at that time.

The hypnotic state is now induced by medical men much less frequently for its anesthetic properties than for the beneficial effects of post-hypnotic suggestion. If the patient in a hypnotic trance is given a suggestion, such as that he will sleep well the following night, or that his pain will cease, he will respond to the suggestion after he has come out of the trance. Post-hypnotic suggestion is used to overcome stuttering, insomnia, pain, and a variety of other conditions. The suggestion weakens in a few hours, and for prolonged disorders must be renewed at rather frequent intervals. Another factor limiting the use of hypnosis by physicians is the bad reputation that hypnosis has acquired through its use in the hands of charlatans and vaudeville entertainers.

Some years ago the "*rest cure*" was popularized by S. Weir Mitchell in the treatment of mental and nervous ailments. A prolonged period of rest is no doubt essential in some conditions, as in convalescence from pneumonia

or influenza, tuberculosis, and in some kinds of heart disease. And for most of us, carried along with the crowd in our hurried, high-gear'd living, relaxation has a distinctly desirable effect from the standpoint of mental hygiene. But for nervous patients it is not primarily rest which is needed, but the things which usually accompany a "rest cure": change of scenery, new companions, and a break in the monotony of everyday life. Retiring to a luxurious sanatorium or to a less pretentious refuge became all too popular. The difficulty lay in getting the patients to stop resting and to return to the problems of life. Nervous patients are already too prone to adopt a program of rest as a shield against being forced to meet difficult situations. With nothing to occupy mind or body, the nervous patient has more time for dwelling on his unhappy lot, becomes even more introverted, and actually aggravates rather than alleviates the initial weakness.

At present the rest cure is being replaced by occupational therapy and by diversion. Effort is made to interest the patient in some hobby, such as weaving, collecting stamps, gardening, golf, or social pursuits. Almost any activity is satisfactory which will occupy time and attention, give the individual an interest in life and in accomplishment, and distract him from brooding.

Re-education, or the replacing of harmful or ineffectual types of reaction by new habits, received its initial impetus from the work of Franz and Lashley. In experiments with monkeys they removed portions of the cerebral cortex, producing paralysis on the opposite side of the body. They noticed that recovery of a paralyzed paw did not take place unless the monkey was forced to try to use it because the other one had been tied up. The same principle has since been successfully applied in re-educat-

ing all kinds of organic disabilities. Forcing a person partially paralyzed by infantile paralysis or cerebral hemorrhage to try to move the paralyzed member may seem cruel, but it aids in recovery of function, and in the end is a kindness. Sometimes after an organic injury, such as a severe sprain of the foot, the individual continues to limp and to favor that leg through habit when it is no longer necessary to do so. Through re-education he may be aided to walk normally once more. Re-education of one who has lost his sight consists primarily in aiding him to substitute tactual, kinesthetic, and auditory cues for visual ones. For a patient who has lost his right arm, re-education involves teaching him to use the left arm effectively, and if an artificial limb is supplied, to gain as much control over it as possible. By wise and prolonged re-education, aphasia and stammering can often be overcome. Phobias and obsessions may likewise disappear through the substitution of socially acceptable emotional reactions and more conventional attitudes.

According to Freud's theory of *psychoanalysis*, neurotic symptoms represent a substitution for the gratification of repressed instinctive urges; a "conversion" of the desire into a physical symptom less shocking to the ego than gratification of the wish would be. Phobias, compulsions, paralyses, anesthetics, and other ailments are thus considered indicative of repressed, unfulfilled desires, usually of a sexual nature. It is the task of the analyst to uncover the hidden conflict, bring it to light, and allow the repressed emotion connected with it to be expressed.

A number of psychoanalysts were forced to break with the more orthodox followers of Freud because of his undue insistence, as they saw it, on sexual impulses, and his complete ignoring of other urges; hence even within the

psychoanalytic group there are dissension and lack of agreement as to fundamental assumptions. Many physicians and psychologists unsympathetic with psychoanalysis have seen in the treatment some excellent devices for promoting mental hygiene, although they repudiate as totally unfounded in fact most of the theoretical assumptions of the psychoanalysts. Many clinicians recognize that physical symptoms, such as paralysis, muscular spasms, aches, pains, and other complaints may result from difficulties of adjustment. They likewise recognize, as has the Roman Catholic Church for centuries, that confession or talking about one's difficulties makes one "feel better"; and in addition gives both physician and patient a more thorough understanding of the latter's difficulties of adjustment and offers a basis for sound therapy in solving them. Hence numerous physicians, using a much-modified conception and practice of psychoanalysis, are daily relieving neurotic patients of their symptoms.

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CHAPTER V

Abnormal Psychology

THERE ARE IN the United States as many patients in hospitals for mental disorders as there are students in colleges and universities; about as many patients are in hospitals for mental diseases as in all other types of hospitals combined. Each year a pathetic army of sixty thousand new cases passes through the doors of hospitals for the mentally sick, where more than half of them finally die. Each hospitalized patient means a disorganized and unhappy family. Moreover, there are many maladjusted people outside of hospitals, each one working mischief in the home, in the neighborhood, and on the job. Approximately ten per cent of all workers are at least partially disabled by nervous disease. The problem of mental disorders is found in every field in which there are human contacts: in the church, in industry, in education, and in the home, as well as in the penitentiary and in bread lines. Dr. William J. Mayo of the Mayo Clinic expressed the opinion that the minor mental disorders not ordinarily severe enough to require hospitalization cause more suffering and misery than tuberculosis or cancer.

While the economic loss due to incapacity of the mentally diseased can hardly be computed, there are definite and appalling figures showing the cost in dollars and cents of maintaining in public institutions those who are men-

tally sick. From about one tenth to one third of the expenditure of each state is allocated to the care of the mentally diseased. One single type of mental disorder, schizophrenia, costs the United States something like a million dollars a day.

Criteria of normality. Until we know what constitutes normal mental make-up, it is obviously impossible to judge what is abnormal. Many of the symptoms of mental disorders are merely exaggerations of tendencies found in more limited degree in people classed as normal. Abnormality is thus a relative thing, dependent on extent of deviation from the average, with no absolute line of demarcation between normality and abnormality. One who is near the center of the distribution curve is considered normal, while those at the outer extremes of the curve are abnormal.

Since an individual seldom is consistently average in all respects, and rarely deviates from the average equally in all traits, the statistical view ordinarily leads to consideration of one trait or tendency at a time, rather than to a summary classification of the entire personality as normal or abnormal. One person may be like others except that he is unduly suspicious; another is average except for his emotional excitability.

Who then is abnormal? If intelligence is the trait considered, the feeble-minded at one extreme of the distribution and the genius at the other end are equally abnormal, although deviation in intelligence toward the upper end of the curve is deemed desirable. Similarly, normal people have both introvert and extrovert tendencies, but typical schizophrenic patients are exaggeratedly introverted, while the manic patients show no introvert tendencies at all, but are wholly extroverted.

The classification of a mental disorder as a psychosis or a neurosis is chiefly on the basis of extent and seriousness of the deviation from the average. People with psychoses, or major mental disorders, deviate from the average so greatly that for their own protection and that of society they must be given treatment in a hospital. Hospitalization is not ordinarily required for those with neuroses, or minor mental disorders, since they do not deviate from the average to so great an extent, or in directions so dangerous to society or to themselves.

Causes of mental disorders. In accounting for the origin of any abnormality of behavior, one of two antagonistic interpretations may be given. One is the physiogenic or organic view, the other the psychogenic. Psychiatrists who accept the *physiogenic* explanation find the source of the peculiarities of behavior either in the nervous system itself, or in the glandular, circulatory, reproductive, or digestive systems, which in turn affect the functioning of the nervous system. In paresis, for example, the behavior abnormalities can be explained on the basis of a degeneration of the cerebral cortex due to the spirochete of syphilis. Cerebral deterioration due to advanced age leads to pronounced mental enfeeblement, to which the defective functioning of other organs of the body contributes. Fever leads to delirium and raving, and focal infections to temporary or permanent emotional excitement. But there are numerous mental abnormalities, some of them very serious, for which no organic cause has as yet been discovered, either by physiological tests or post-mortem examination. Concerning these disorders, there is a difference of opinion among psychiatrists, some imputing to them a psychogenic origin, others holding that the absence of demonstrated structural change does

not prove that there are no structural changes, but merely that sufficiently refined methods of discovery have not yet been developed. They maintain that some day the organic cause will be discovered. As precedent for their view they cite the history of paresis. Not many years ago even the most reputable books on psychiatry listed paresis as of psychogenic origin, due to "reverses of fortune," "domestic troubles," "excesses of devotional feeling," and the like. Logically enough, treatment at that time was designed to improve these conditions, but nevertheless the patient died within five years. With the discovery that the symptoms of paresis are due to invasion of the cerebral cortex by the spirochete of syphilis and not to disappointment in love, suitable treatment has been instituted.

According to the *psychogenic* view, behavior abnormalities are explained either in psychological or in psychoanalytic terms. The usual psychological explanation is in terms of the acquisition of socially undesirable habits. The suspicions of paranoia, for example, are interpreted as the result of the gradual development of a warped point of view. According to the psychoanalytic view, the origin of behavior difficulties is to be sought in wishes and desires repressed into the unconscious. Both psychogenic attitudes recognize physical changes chiefly as consequences of mental states, and by treatment attempt to change the mental condition as a means of improving the physical condition.

At the present time, neither the physiogenic nor the psychogenic view alone seems to explain adequately all forms and kinds of mental disorders. It appears entirely possible that some peculiarities of behavior are due primarily to organic abnormalities such as a focal infec-

tion, or prolonged use of opium, or bacteria in the cortex of the brain; while others are the outcome of formation of bad habits of thinking or reacting.

Symptoms of Mental Disorders

In the field of mental disorders, symptoms are signs that the brain or its functioning is disordered. A symptom is at the same time a "signpost" pointing to a particular kind or phase of disease. For that reason it is important to be able to recognize the more usual symptoms, to interpret their significance, and to know of what disturbed conditions each is characteristic. The symptoms are numerous and varied, including disorders of sensation and perception, of the content and processes of thought, of memory, emotion, and motor reactions.

Disorders of sensation and perception. These are of two chief kinds: *anesthesia*, or loss of sensitivity; and *hallucinations*, the experiencing of sensations with no external stimulus. Anesthesia may be of organic origin, as in the case of loss of cutaneous sensitivity resulting from a blood clot in the brain, or from a cut nerve. In mental disorders, however, anesthesia is usually functional, indicating conflicts in the personality rather than organic disorder of the nervous system. Anesthesia not conforming to distribution of sensory nerves, such as "glove anesthesia" or "shoe anesthesia," affecting only parts covered by glove or shoe, gives evidence of the functional nature of the condition. In the days of witchcraft persecutions, discovery of the "devil's claw," a patch of skin insensitive to pain, was evidence enough to send a "witch" to her death. Today such anesthetic areas are not infrequently found, but indicate nothing more serious

than hysteria. Hallucinations are among the most frequent symptoms of mental disease; the mentally disordered hear voices coming from the radiator, the electric-light fixtures, or from any conceivable source; they see before them in the flesh relatives who are dead or distant; they taste poison in the food; smell poison gases in the air; and feel electric shocks from unseen batteries. Some hallucinations, such as the visual hallucinations in delirium tremens and the sensations of crawling insects characteristic of cocaine addiction, are the result of disordered organic conditions; others appear to be projections of emotional conflict, in which the individual sees or hears the thing feared or longed for.

Disorders of the content of thought. Hallucinations may lead to *delusion*, a persistent belief in something having no existence in fact. A delusion represents a disorder of the content of thought rather than of the thought process itself. The deluded person wants to believe, and holds to his delusion in spite of what would appear to a normal person to be adequate proof of its falsity. The emotional warmth with which the delusion is adhered to indicates that the essential factor in the situation is the emotion, and not the content of the false belief. Delusions vary in systematization from those which are manifestly absurd, as for example a delusion that the patient has no head, to those which are highly systematized and sound true. A colored woman who said she was the wife of a prominent physician hired a lawyer to help her locate her two children who had disappeared on the way home from school one day. The lawyer had worked on the case several weeks before he discovered that the woman was not the wife of the physician—they had been schoolmates in the sixth

grade, but he had not seen her since that time—there were no children, and consequently no children had disappeared. So well was it systematized that the story sounded entirely plausible. Some delusions are temporary; others remain the same for months and years. Among the most frequent are delusions of grandeur, illustrated by the belief that the patient is the richest man in the world, has a thousand wives, and a million sons. Or the patient may have delusions of self-accusation, and believe that he has committed some unpardonable sin. Delusions of grandeur ordinarily accompany an exalted emotional state, while delusions of sin are characteristic of depression.

Disorders of the thought process. Delusions represent disorders of the content of thought, but sometimes it is the thinking process that is disordered, as illustrated by *retardation*, in which thinking is so abnormally slow that the answer to a question may be delayed a full minute, or even five minutes. At the opposite extreme is *flight of ideas*, in which thinking is tremendously speeded up, and the patient jumps from one line of thought to another with little apparent connection. Retardation is characteristic of melancholia; flight of ideas of mania.

Disorders of memory. The most frequent symptom in the field of memory is *amnesia*, or abnormal loss of memory. Very old people may remember events of childhood clearly, but forget happenings of the day almost as soon as they occur. The aged mother complains that her son never visits her, whereas the truth may be that he left only ten minutes before. Most people have had the embarrassing experience of being unable to recall the name of an intimate friend when attempting to introduce him. Emotion blocks recall in this everyday

instance, and operates similarly in more serious situations, as for example, in the famous case of Irene, who nursed her mother through a long, painful illness, attended her at her death, and then had amnesia for the entire occurrence, and wondered why she had not been with her mother in her illness.

Disorders of emotion. These vary from *euphoria*, or senseless elation, to *melancholia*, some patients alternating between them. Or the abnormality may lie in *apathy*, or the lack of suitable emotional response, illustrated by the patient who remains indifferent, manifesting no sorrow at bad news or elation at joyful tidings. *Phobias*, or abnormal fears, represent another common type of emotional exaggeration.

Motor disturbances. Motor peculiarities of the mentally disordered are of many kinds, including *cataplexy*—that is, assuming and maintaining queer postures—and *paralysis*. A slightly different motor symptom is seen in the *compulsion* to perform some act, such as proceeding by a hop, skip, and jump, stepping on every crack in the walk, touching every telephone pole, or endlessly performing some automatic act. A type of compulsion more serious from the point of view of society is seen in *kleptomania*, in which there is an irresistible impulse to steal, and *pyromania*, an overwhelming urge to set something on fire.

Classification of Mental Disorders

As there are many types of mental abnormalities, no one explanation can possibly account for all, any more than fever can be traced to one causal factor. Nor is any one basis of classification wholly satisfactory. Mental

disorders are commonly divided into groups on the basis of degree of interference with normal adjustment in society. One whose mental functioning is profoundly disturbed, whose defects are likely to incapacitate him for life in society and to necessitate hospitalization, is said to have a psychosis. One suffering from a relatively mild abnormality, not marked enough to interfere seriously with his remaining at large and continuing in his usual activities, is said to be neurotic, or to have a neurosis. The neuroses constitute the minor mental disorders; the psychoses, the major ones.

Psychoses. The psychoses may be classified according to cause, beginning with those of definite organic origin, and proceeding to those whose origin is either mental or unknown.

Paresis is the name given to the mental disease resulting from degeneration of the cerebral cortex due to syphilitic infection. Diagnosis of the condition is based less on behavior symptoms than on laboratory tests, the most important of which is the Wassermann test for syphilis. The degeneration of the brain is accompanied by loss of motor co-ordination, by mental deterioration, failure of memory, and delusions, usually of grandeur.

Senile dementia, or old-age deterioration, results from cerebral degeneration and hardening of the cerebral arteries, as well as from other bodily changes incident to old age. Memory is disturbed, judgment weakened, and the general mental level much lowered. Delusions and hallucinations sometimes appear.

Involution melancholia is a psychosis caused by endocrine disturbance, primarily due to the withdrawal of gonadal secretions at the involution period of life. The chief mental symptoms are profound depression and re-

tardation of mental processes, often accompanied by delusions of sin or unworthiness. There is always danger that the patients may commit suicide because of their unhappy frame of mind. Glandular therapy results in cure in the majority of cases.

Paresis, senile deterioration, and involution melancholia are primarily medical rather than psychological problems, as are other mental disorders accompanying bodily disease. Still other disorders result from poisons generated within the organism, such as toxins from focal infections; or those introduced from without, such as alcohol, opium, or cocaine. The psychoses briefly described above are definitely due to organic causes. There is much less definite information as to the causes of those which follow.

Patients with *manic-depressive psychosis* oscillate between wild excitement and emotional depression. In the manic state the patient shows flight of ideas, talking constantly and loudly without much coherence of thought. At the same time he exhibits emotional excitement, accompanied by motor activity, stripping off his clothes, tearing up the mattress, or trying to batter down the door. After a few weeks or months he may pass into the depressed phase of the psychosis, sitting about apathetically in deep melancholia, refusing to speak at all. A few weeks later he may be entirely normal, able to leave the hospital and resume ordinary pursuits for several years. Usually, however, other attacks follow, in which mania again alternates with depression.

Another little-understood psychosis is *dementia praecox*, also called *schizophrenia*. This disorder seems characteristic of introverted people who even before *dementia praecox* actually develops are peculiarly absent-minded

and show emotional inadequacy. About one fourth of all admissions to hospitals for mental disorders receive this diagnosis. Since the disease is one that ordinarily begins in youth and is not fatal, fully half the hospitalized mental patients are schizophrenic, and show a "splitting of the personality." The "split" occurs between the emotions and the intellect, the patient reacting inappropriately, inadequately, or not at all to emotional stimuli.

For years psychiatrists have recognized four chief forms of dementia praecox, all having certain symptoms in common, but each presenting quite different clinical pictures. Now it is thought that instead of one disease entity, taking four forms, there may be four distinct disorders that have in common only a lack of integration of intellectual and emotional life. The symptoms of the four are different; the course of the disorder and chance of recovery of each differ from those of the others; the causes appear different; even the physical characteristics are different. The four disorders are simple dementia praecox, characterized mainly by indifference; hebephrenic dementia praecox, marked by silliness and childishness of thought and action; catatonic dementia praecox, characterized by motor peculiarities, such as rigidly maintaining queer postures; and paranoid dementia praecox, with fairly well systematized delusions and hallucinations. In all four, mental deterioration and emotional indifference, with fleeting hallucinations and delusions, are evident.

Paranoia is even less understood than is schizophrenia. No underlying cause of an organic sort has been discovered, nor has any satisfactory method of cure been demonstrated. The symptoms of paranoia develop insidiously through the years, strengthening and accentuating certain distortions of thought. Paranoia is a psychosis

characterized by fixed and systematized delusions, usually of a grandiose or persecutory nature. There is no deterioration, such as is characteristic of the paranoid form of schizophrenia, and hallucinations are rare. The mind of the paranoic works normally and logically, but on false premises. Except where the delusion is involved, he likewise acts in a normal fashion. For this reason paranoics constitute a serious menace, as they may not be recognized and hospitalized in time to prevent their committing crimes based on the delusional system. A paranoid woman, for example, believed that a certain taxi driver brought his car almost to a stop whenever he saw her approaching, and squirted on her clothes some substance which even dry cleaning would not remove. She went to the office from which the taxi drivers started out and waited for her persecutor to arrive. In some way the suspicions of another driver were aroused, and he summoned the police. In her pocketbook was a revolver with which she had intended to end the persecution.

Neuroses. For every person with a mind sufficiently warped to necessitate treatment in a hospital, there are probably a score with minor maladjustments. Hence the symptoms of the neuroses are much more familiar to the layman than those of the psychoses. Moreover, from the psychological point of view, the neuroses are of more significance because of the importance of psychological factors in causing and overcoming neurotic tendencies. There are three chief neuroses: neurasthenia, psychasthenia, and hysteria.

Almost every person is neurasthenic for at least a brief period some time in his life. In the first week or two following a bad case of influenza all the symptoms of *neurasthenia* can be observed. Many people whose resistance

is low remain constantly in a neurasthenic state, the outstanding symptom of which is fatigability, and an utter weariness at the slightest mental or physical exertion. At the same time insomnia, lack of appetite, and heightened sensitivity to all stimuli are likely to be evident, accentuating irritability of mood and nervousness of reaction. Emotional outbreaks and weeping are easily aroused. All of these symptoms are familiar as typical of convalescence, and as permanently characteristic of some people. They are all signs of a run-down condition of the body, of which glandular imbalance and anemia are prominent features.

Prolonged neurasthenia seems to predispose to a chronic attitude of anxiety or worry. As soon as one worry is eliminated, the individual frets about another; when his mind is relieved on that score, another source of worry is found. He gives the impression of almost going out of his way to find something to worry about. This state of constant fretting may grow out of a sense of insecurity, and is possibly due to an over-protected childhood that allowed too little opportunity for developing adequacy in meeting difficulties; or it may be that the memories of past failures produce the fear of failure.

A few years ago neurasthenia was explained as being due to overwork, but now we frequently see in the condition the effect of underwork rather than overwork. The mother of a family of growing children does not become neurasthenic while the children are little and her days are full, but as the children grow up and leave home, she is left with time on her hands—and neurasthenia. Prolonged idleness leaves time for assiduous attention to oneself, to feelings of fatigue, and indications of strain, which become exaggerated by introspection until they are taken

to mean serious physical disability. Most chronic neurasthenics are self-centered, and appear to be making little real effort to recover. The "delicate state of health" serves as a shield against undertaking difficult problems and as an excuse for avoiding direct contact with life. The treatment of neurasthenia involves improving the general health by proper sleep and diet, by supplying deficient hormones, and by furnishing an interest more absorbing than the pleasure derived from possession of the neurasthenic symptoms.

Psychasthenia is the name designating the neurosis characterized by phobias, obsessions, and compulsions. Many people have a few at least mildly psychasthenic trends, but the condition is far from being as general as neurasthenia. The mental phenomena of psychasthenia also deviate from the normal more than do those of neurasthenia, and make the behavior of the psychasthenic more incomprehensible than that of the neurasthenic. A phobia is an exaggerated fear of a particular stimulus or situation. Most adults have a strong prejudice against handling snakes, but some are so handicapped by a phobia of snakes that a trip into the country becomes impossible. Others have an uncontrollable fear of cats, open spaces, high places, germs, knives, water, or almost any object or place. Any of these under certain conditions might be considered legitimate objects of fear, but in a phobia the fear is out of all proportion to the stimulus. The victim usually knows that his fear is illogical and unreasonable, and struggles to overcome it, but the emotion is stronger than he.

There is not complete agreement as to the origin of phobias, but they are thought to be conditioned fears resulting from an exceptionally intense emotional experi-

ence in the past. Later the presence of a part of the fear-producing situation sets off the emotion. The obtrusive presence in a psychasthenic individual of a persistent idea that is unwelcome and unreasonable is termed an obsession. A tune which runs through the head to an annoying extent is an everyday example of the sort of persistent idea which, when exaggerated, assumes the proportions of an obsession. The idea is recognized as irrational, yet is not amenable to control. An obsession often leads to a compulsion, an irresistible impulse to perform some act. For example, one may be obsessed with the idea that his hands are dirty, and so wash his hands every five minutes. Obsession with the idea of disease leads to endless drug taking. The best-known examples of psychasthenic compulsive acts are pyromania and kleptomania. Persons with these uncontrollable impulses often need hospitalization to protect the lives and property of others.

Most people think of *hysteria* as meaning "hysterics," an attack of uncontrollable laughing and crying, but this is only one manifestation of hysteria, and relatively a minor one. Hysteria assumes many forms, varying all the way from an attack of hysterics to multiple personality. Only an occasional hysteric patient finds his way into a hospital, and comparatively few seek aid from physicians, but to their friends and associates, many seem to present serious problems of adjustment.

Hysteric people differ widely in the specific symptoms they show, but in underlying personality traits there is an obvious resemblance. Hysterics as a group are extroverts, greatly enjoy an admiring audience, and dislike being ignored. They are highly suggestible, which no doubt accounts for the appearance and character of many

of their symptoms. A study of the childhood of an hysterical individual almost without exception reveals defective discipline, resulting in poor control. The four-year-old who dominates the family by temper tantrums, or by vomiting when his slightest wish is not granted, may have to change his tactics somewhat as the years pass, but even in middle age can get his way by a heart attack, fainting, or by presenting some other symptom that arouses the anxiety or solicitude of his associates. Hysteria is not really a disease, but an unconscious form of trickery that the individual has learned to use as a means of making environmental conditions more to his liking. The many forms taken by hysteria indicate that there are numerous ways in which a selfish person may dominate others and attain an adjustment satisfactory to himself. The symptoms of hysteria can be understood only through analysis of the origin and growth of the disorder. The condition can be cured only by complete re-education. So far as is known, there are no organic causes of hysteria, and no form of physical therapeutics is successful in overcoming the symptoms.

Most of the symptoms previously described as functional are regarded as evidence of hysteria. Paralysis that disappears during sleep or that shifts from one part of the body to another is of this sort, as is anesthesia not following the distribution of sensory nerves. Another manifestation of hysteria is somnambulism, which is akin to sleep-walking. Lady Macbeth's sleep-walking scene illustrates the characteristics of somnambulism. The eyes are open, and automatic acts are performed, but the individual is obviously not in a normal state. An even more exaggerated degree of dissociation of the personality is seen in multiple personality, in which the different per-

sonalities are ordinarily extremely dissimilar in character and tastes. Cure can come only through synthesis of the traits and memories of the various personality states.

Blindness, deafness, indigestion, swelling, and other conditions simulating organic disease may be of an hysteric or functional nature. An hysteric convulsive attack, for example, may so closely resemble epilepsy as to be superficially indistinguishable from a true epileptic convulsion, though careful study shows important differences. A person who has true epilepsy may have an attack at any time, anywhere, even on the street, or when alone at night, and is very likely to bite his tongue, fall against a hot radiator, or otherwise injure himself. The attack of hysteric epilepsy seems staged; it always occurs when there is an audience and something to be gained by the attack, and in falling the individual manages to avoid hitting the furniture and remains unhurt. The true epileptic is unconscious during the "fit"; the hysteric knows what is going on about him and seems to be watching to see how his audience reacts.

Mental Hygiene

Some of the psychoses and neuroses are entirely preventable: if an individual does not become infected with syphilis he cannot develop paresis; a prerequisite to delirium tremens is alcoholic indulgence; reaction tendencies of an hysteric sort may be prevented by constructive training and firm discipline. Many neurotic and psychotic people can be kept from actual breakdown by wise and tactful handling when a mental collapse appears imminent. Yet only recently has the importance of mental health received wide recognition. Strangely enough, the

Mental Hygiene Movement, which in twenty-five years spread throughout the entire world, was launched by a man who had just emerged from a mental hospital where for several years he had been a patient. Clifford Beers came from the asylum burning with a desire to ameliorate the condition of the mentally ill confined in hospitals. Publication of *A Mind that Found Itself*, Beers' account of his experiences and the harsh treatment received in various institutions, led to the formation in 1908 of the Committee for Mental Hygiene. At first an attack was made on the problem of improving the treatment of patients in state and private institutions for the mentally ill. The movement soon expanded to include the promotion and preservation of the mental health of the entire population. Since the beginning of the reform instituted by Beers, the mentally ill have ceased to be incarcerated in custodial asylums in which strait jackets and other abuses were everyday occurrences, and are now given treatment in progressive hospitals. Numerous clinics have been opened for those who are not ill enough to need hospitalization, but who require aid in adjustment, as well as clinics and social service for the after-care of patients who have been discharged. Preventive measures have taken the form chiefly of mental hygiene and child-guidance clinics, of which there are well over six hundred in this country. Through education and training, every teacher is becoming more and more conscious of her role as a mental hygienist. The most promising program of prevention has to do with the child, for the habits of the adult are too firmly ingrained to be easily broken.

There are no short cuts to mental health and balanced, rational living; nor are rules for mental hygiene ordinarily very helpful. However, the following summary of the

factors most essential to the acquisition and maintenance of a wholesome attitude of life, given by a Boston psychiatrist, Myerson, is well worth remembering.

The first factor is the inculcation of habits which restore sleep and appetite, since both of these are usually impaired in the minor mental diseases. Sixteen hours of consciousness is more than enough for the average human being; more is too much of a good thing. Parenthetically, a short nap in the middle of the day is the finest prophylactic against nervous exhaustion. And the joys of the table add too much to life to be missed. A program of therapeutics which, by means of exercise, medicines, baths, diet, etc., fights insomnia and anorexia is essential. He who sleeps and eats well faces life well, and can usually handle his own complexes. But when one lies awake at night, little troubles become big ones, and when food tastes like straw, it's time to see a doctor.

This rather crude but remarkably effective, if successful, preliminary treatment needs its psychotherapeutic side to render it human. The psychotherapeutic is as simple to enumerate as it is difficult to follow:

Adjust ambition to abilities.

Know something about yourself, but not too much. It may not be pleasant in any event.

Control emotion, especially fear and hyperaesthetic disgust.

Alter intolerable situations if they are alterable, if not, make the best of them. (Few situations are really intolerable.)

Thrust out prolonged remorse, for few are the sins that are prevented by dwelling overmuch on them. Likewise, at times give your conscience a rest. Parenthetically, over-remorse and over-conscientiousness are often a disguise for less creditable things.

Make moderation the golden rule. Periods of rest

after exertion, periods of privation after pleasure.

Above all, develop endurance. This a better rule for the prevention of minor mental diseases than for their cure, and this applies mostly to children.¹

A very good eleventh commandment would be, "Thou shalt not be too fussy."²

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¹ Myerson, A., *The Psychology of Mental Disorders*, pp. 71-72, Macmillan, 1927. By permission of the publishers.

² *Ibid.*, p. 135.

CHAPTER VI

Social Psychology

SOcial PSYCHOLOGY is the study of human nature in relation to its human environment. The highest stage of evolution we know anything about is peaceful and progressive group life among human beings. In many respects life may be simpler if lived in solitude or in relatively unpopulated areas with little or no interplay of mind upon mind, but it would be exceedingly barren. If one were not only without human associates, but if he were also to be deprived of books, music, and all the convenient products of industry, his life would be immeasurably lacking in richness.

The field of social psychology is very broad indeed, having to do with any and all contacts of person with person. There are several approaches to the subject: one is to put the major emphasis on man's original make-up—his unlearned tendencies and motives—and then to attempt to trace their influence on social institutions; another is to begin with existing institutions—home, school, church, and so forth—and to trace their influence on the personality and behavior of the individual.

There is an almost endless list of topics properly belonging to social psychology, a few of which are the radio, newspapers, schools, reformatories, churches, movies, politics, and propaganda. Since the field is so inclusive, no effort will be made even to touch on all the topics; but

the purpose will be to consider briefly some of the bases for social and anti-social behavior, types of groups and binding forces, and certain techniques for modifying conduct and opinion.

Bases for social reactions. Let us start with the nature of the human being. What is it in his heredity that seems to make it necessary for him to seek contacts with other human beings? And by what means does environment act on man's original nature to modify it and possibly accentuate the social tendency? Certain conditions are apparent to the most casual and superficial observer. The new-born baby is totally helpless and dependent on human beings for maintenance of life, and to an appreciable extent his nature may be affected by this dependence. If he could be kept alive by purely mechanical agencies, never having any sort of contact with human beings or even animals, would he be "gregarious" as he now seems to be? Would he have a "social nature"? These questions can doubtless never be answered on the basis of scientific experimentation, but probably the answer to both of them is in the affirmative. It seems impossible that man has no native drives toward society; his conduct as we find it after a few years of life with others is too responsive to social stimuli to be explained on any other basis than that of native equipment.

In any case, at birth and for a little while thereafter, the baby gives no evidence of social interests or of gregariousness. But soon he begins to notice and smile at his associates; he also smiles at the swaying electric-light bulb, but there is a difference that he very soon learns. By the end of a few weeks he has learned how to manage his attendants, unless by chance they are managing him

instead; and his social nature is being molded by human contacts. By the time he is two years old he has become very social indeed. He has developed a tendency toward selfishness, independence, sympathy, obedience, or their opposites, as well as scores of other social attributes. All these qualities must be inherent in the original equipment of the child. One could enter into the philosophy of the question and raise the issue as to biochemical or biopsychological mechanisms, instincts, dynamic tensions, and so on; but for practical considerations it seems reasonable to assume the existence of some sort of a material organism to respond; and that that organism may be constantly changing as a result of its activities and responses.

Of all native tendencies, the one most essential to social evolution, understanding, and integration is language. Probably none of the intricate human institutions civilization has produced could have been conceived without it; and barring direct imitation, practically all modification of human behavior due to the influence of others is based immediately on the use of language, oral or written. As a tool of social interaction and as a means of transmitting culture from one generation or country to another, it has no equal.

Conflicts with society. There are certain biological and environmental factors that bring about anti-social behavior. Probably all misconduct is social in character: if a man were totally and permanently alone in some locality, with no living creatures for him to annoy or abuse, and if none were ever to come there to suffer by any act of wasteful destruction he might have perpetrated or to profit by any constructive act of his, he probably could not do anything either "right" or "wrong."

Since his being alive or dead has no effect on anyone, no ethical question could arise.

How shall we account for wrongdoing? Is it innate depravity? An inescapable feature of human nature? Our forefathers certainly thought so. There probably is a certain degree of truth in the theory; at least, belief in the possibility of freedom of choice implies a native tendency toward choosing immorally as well as morally. It becomes largely a matter of environment or training as to which tendency will predominate. However, there are some people who seem, in much higher degree than others, predisposed to delinquency or crime. That fact is occasionally to be observed among members of the same family, having as nearly as possible the same heredity and environment. There is an occasional "black sheep" in the best of families. There are many factors entering to affect the situation: what is good environment for one constitution and temperament is not of necessity suited to another; desirable motivation for one has no appeal for another. That may be explained in part on the basis of physical condition: glands, brain, reflexes, and other mechanisms; but it is hardly likely to be only that. The organization of a human being and his relation to his total environment, human and otherwise, are exceedingly complex and make an answer in mechanistic terms seem entirely too simple to be true.

Nevertheless, the physical make-up is a highly significant and contributory factor in some types of delinquency. In a clinic for glandular disturbances, the writers observed a number of such cases among patients coming there for interview and treatment. Some had been oversexed, and treatment or operation had so remedied their condition as to make them entirely or almost normal, thus eliminating

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the outstanding cause of their impulses toward aggressive misbehavior. In most cases the patients were a little inferior mentally, and that weakness, coupled with the other undue strength, made a combination distinctly dangerous to society. In one case a disordered thyroid gland was responsible for such lethargy that the individual was unable to keep any job; he was considered lazy and indifferent—as, indeed, he was; but until the physical cause was removed, he could not help being lazy. There were other types of personality disturbances, too; all of them caused by a malfunctioning body. When the full relationship between glands and anti-social conduct is understood, we shall know much that we now only dimly suspect.

But more frequently the causes of crime are strictly environmental. An unsatisfactory home life and bad companions are among the most potent influences. Entirely inadequate playground space is another. Investigation shows an inverse relation between the number of misdemeanors in congested urban localities and the acreage available in vacant lots or parks for impromptu ball games and other free play. There is also a greater incidence of misdemeanors in the vicinity of commercialized amusement centers than in other areas. Evidently it would be a good investment both morally and financially to leave unoccupied areas at frequent intervals in crowded cities. If there is wholesome entertainment at hand, young people are glad to get it; but if there is not, discontent and boredom force them to look for excitement, and unexpectedly they find themselves in conflict with the law. Someone in the gang has made an injudicious suggestion, half in fun, and the emptiness of the occasion made it seem interesting to someone else; he promoted the

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idea and it was carried out, perhaps much to the regret of the entire group a few hours later. Then, when he has once made a start downhill, the rest of the descent follows fairly readily.

It is for that irresponsible but not vicious type of young person that improved environment, wholesome friendships, and, above all, desirable motivation prove a salvation. There is no one motive with universal appeal. To some it is saving money for clothes, travel, education, or something else money will buy. To others it is social prestige or approval; they want to be liked or to get ahead. Still others are motivated by religious appeals, family traditions, or athletic prowess. The list of incentives is long, as the age, sex, general background, and personality of the individual all constitute part of the situation. That is why teachers, city Y.M.C.A. and Y.W.C.A. directors, scoutmasters, and others who have direct contacts with young people and influence on their social activities, should be such all-round individuals. They must understand and sympathize with every sort of ambition or lack of it, for they will probably have to cope with it. The hackneyed statement about the ounce of prevention would apply very well here.

Types of groups and unifying bases. On what bases are people brought together into groups, and what determines the type or character of the group? There are heterogeneous and temporary groups, very loosely bound, illustrated by a throng of people on the street during a rush hour, each individual hurrying to his own destination and busied about his own concerns. An accident or a window display may cement the group closely for a moment, but the interest is extremely evanescent. A group with a somewhat greater basis of common interest

would be one gathered together voluntarily for a popular entertainment, a movie, or an inaugural ceremony. A somewhat different type of temporary group is the mob, fleeing from disaster or bent on lynching, and very closely unified by common emotions.

More permanent bases for formation and binding of groups are created by common interests along cultural, artistic, vocational, scientific, or any other lines; graduation from the same school; and belonging to the same church, fraternity, political party, or nation. Even those physically isolated may think of themselves as belonging to a group, fused into a whole by common attitudes and beliefs.

The most permanent bases of union are the ties of family, race, and nation. The family or blood group in most cultures, however simple, has a certain measure of permanence as compared with such extremely transient groups of people as are drawn together by momentary interest. Its basis is not artificial, but a fundamental type of integration. Even though the family is a "natural" group, unless its members grow up together with many mutual interests, or at least keep in fairly close touch with one another, it has less solidarity than most interest groups.

In small primitive tribes, sensory experiences and contacts, and common needs and backgrounds seem to be the binding factors. If members of the group do not work together for their own mutual good, disintegrating elements arise to destroy their peace. Their organization, however, is very meager; in fact it is so low on the most primitive level that they cannot engage successfully in warfare. Their culture is very simple, belonging to the unit as a whole and having almost no religious, poli-

tical, or other kind of subdivision. It is not until genuine organization and specialization, even though rudimentary, are under way that derived or remote interests begin to sway the group and divide it into smaller units, each with its own concerns.

On higher levels of culture, large groups such as races and nations are bound together by common needs, by fear or dislike of other similar groups, and by customs and traditions handed down from past generations, sometimes from a period so remote that the origin of the custom is lost in antiquity. Any new or unfamiliar practice that conflicts with any of these, the most vigorous binding forces, is viewed with suspicion, and has great difficulty in gaining group approval. The group feels that change and disintegration go hand in hand.

Other cementing forces only slightly less effective are conventions, which may grow out of custom or tradition, or may be of contemporary origin. Conventions ordinarily regulate current, everyday usages and opinions, while customs govern more fundamental matters. If an innovation does not challenge custom or evoke too much serious comment, it may ease its way in, making converts here and there. Many, such as marathon dancing or pole-sitting, gradually die out; but some grow and spread, until the majority of people recognize them as desirable additions to the contemporaneous culture.

To a few ultraconservative individuals a convention may be as binding as custom, though it is not generally so accepted. So also a few eccentrics enjoy defying convention, but the average person considers it better taste to be relatively inconspicuous and conventional unless occasion calls for display of originality or disregard of convention. On the other hand, to defy or disregard a

custom is as great an irregularity as to break a basic law of society; customs are binding, though usually unwritten. If a convention develops into an especially valuable asset to the group, it may become a custom, but it would require decades, at least, to bring it about. A taboo is a negative custom or convention; some things "are not done," though there is no written law against them.

Fashions and fads are relatively transitory in nature. Fashions usually govern dress, housefurnishings, and decorations, and affect a large portion of the population. Fads or crazes may be found in any department of life or behavior. They are ordinarily more local in character and affect fewer people than do fashions, but some, miniature golf, for example, become very widespread in the areas and classes affected.

Forces modifying opinion. The altering of attitudes which, in their turn, determine behavior may be a matter of narrow and temporary scope, illustrated by the use of suggestion on an individual or group, or of very wide range and relatively permanent nature, as in the case of education and of propaganda.

Suggestion, as a rule, is employed in order to secure immediate results. Whether used on one person or on a large audience, its basic principles are the same; however, because of the typical suggestibility which characterizes groups, it is frequently easier to obtain a group response than individual responses from each member of it.

The more emotional the assemblage, the more suggestible it is; the term "emotional" meaning that at the moment, at least, it is not being controlled by intellect. Whenever action is desired from a group, the quickest way to bring it about is by arousing the emotions. The intellect is cold and calculating; it counts the cost. But

emotion leads to action. A silver-tongued orator can make his audience "think" whatever he wants them to. It is largely a matter of arousing emotion; and since nothing is more communicable than emotion, the contagion spreads until perhaps the entire group is infected. That is the secret of mob action. Members of a mob are riotous and unlawful as a group, but not, probably, as separate individuals. And they are thus disorderly because they are being swayed by their emotions and are not doing any thinking. Furthermore, they can scarcely be made to think, so powerful is emotion when reinforced by group contagion. However, when the average group, such as a religious gathering or a convention, is subject to suggestion, it retains its intellectual activity in high degree, and is less influenced by emotional appeals.

This implies that one can avoid the power of suggestion by keeping his mind alert. That is largely true; but most people, perhaps fortunately, are not always alert to, or at least suspicious of, the motives of their associates, and it is then that suggestion operates. Suggestion is most effective when it arouses no opposition; when one is even unconscious that it is being used on him. The one using it may also be unconscious of the influence he is exerting. That is mainly true in motor situations, as when someone in a crowd happens to fix his eyes sharply on some object. He may be quite unaware of his act, but the chances are that several people will turn and look at the object he is observing. Or if a very erect person enters a room, several individuals may be seen immediately improving their posture, with or without noticing that they are doing so. Such suggestion also explains the unconscious imitation of a smiling or scowling face, a child's imitation of his parents' speech and gait, and the

sympathetic tears that are sometimes seen at a funeral or wedding. Even the dancing mania of the fourteenth century was based on unconscious imitation.

To be effective, suggestion needs to be very subtle; otherwise it is as antagonizing as a command from one having no right to issue orders. If the doctor enters the room with too aggressively smiling a countenance, the patient immediately suspects the worst; but an air of confidence and a cheerful manner, if not overdone, contribute definitely not only to the well-being of the patient, but of the whole family. A teacher who seems to be anticipating a definite type of behavior from her class usually gets just about what she seems to be expecting, even though the children had not previously decided on any one line of conduct. The person who remains intelligently calm through an earthquake contributes much of value to his associates, while the panicky person is almost another major disaster.

Direct suggestion often is not recognized as such because it is so well done. A mother who suggests that it is about time to get washed for dinner usually gets better results than one who issues an order to go and wash; the command tends to suggest not doing it; to arouse a counterimpulse. The Quaker mother who always said "hadn't thee better" do this or that further illustrates the point. A teacher who drops a skillful hint or two about the contents of the advance assignment is using suggestion admirably. Intelligent use of it tends to make things run smoothly; but bungling use of it is very tiresome.

Both direct and indirect suggestion are often used to influence an audience. In a political meeting, such devices as flattery, jokes, the implication that this famous orator, with all his prestige, is just "one of us," a com-

mon man, devoted to "our" interests, and so on, usually win the hearts of many who came to scoff, but are surprised to find that they like the man after all, favor his program, and will vote for him. A shrewd use of words and phrases, such as referring to "our loyal colored friends" in one locality and to "the dirty niggers" in another, may appeal only to one's prejudices, and leave his eyes completely closed to the actual facts.

Another technique sometimes used to break down the reserve of a heterogeneous audience, unify them, and render them receptive to entertainment, exhortation, or any other performance, is community singing. There is something about group singing, if it can be accomplished, that disposes toward courteous attention, or at least disarms opposition. Familiar, rhythmic, and semipopular or sentimental songs like *Dixie*, *Swanee River*, or *Juanita* are well-nigh irresistible.

On the other hand, an audience assembled to listen to a lecture or musicale is relatively homogeneous, has come specifically to listen, and requires no unifying. Flattery or cajolery would offend them and also lower the performer in their estimation. However, their common criticism would unify them more than would an intellectual appraisal of the entertainment. So also would an enthusiastically favorable reception tend to cement them; a matter again of emotional contagion. If the members of an audience are not at all moved emotionally, they remain almost as isolated as if they were dispersed in their many homes hearing the program over the radio.

As has been indicated, custom dictates much of the conduct and the *public opinion* responsible for that conduct. Public opinion is one of the most powerful spurs to desirable conduct, and a preventive of undesirable.

But there is no one public opinion. In a village or rural area many things would be thought completely improper, or taboo, that pass unquestioned in denser centers of population. And there what passes for good form, or at least is totally unchallenged in one group, would be hopelessly wrong in another. In a small town, public opinion, as a rule, will promote conservative personal decency and order; in a large city, it will be less concerned with matters of individual conduct, and more with society as a whole, though the individual will come in for some attention.

Just how public opinion originates and becomes so widely acknowledged and accepted is partly a matter for speculation. It once was typically a gradual process, probably a combination of rational and emotional judgments. Before newspapers and radios came into such practically universal use, the diffusion of knowledge and ideas and the establishment of attitudes and beliefs were largely matters of individual communication within the confines of a relatively small group, and hence took place much slower than they do now. But at the moment, national and even world opinions seem to change almost with the moon. With all the highly perfected agencies and techniques of propaganda at his command, a Hitler, a Mussolini, or perhaps even a Coughlin, can upset existing convictions and sentiments, and if he cannot render operative a contradictory pattern of thought, he can at least confuse the public completely. Today it is probably impossible for any but the coolest thinkers and the best-informed to be other than bewildered by the conflicting opinions and programs being volunteered as solutions to the existing social turmoil. Because of the increasing use of propaganda at the moment, its characteristics, func-

tions, and techniques are of particular interest from the psychological angle.

By *propaganda* is meant a systematic effort to gain support for a belief or procedure. It tries to persuade to action. However, argument as such is not one of its techniques, for it recognizes no other side to the issue—there is only one side, and the propagandist is intolerant of any suggestion that there could be another side. Its purpose may or may not be announced; sometimes the purpose is announced, but not the motive; although in many instances the propagandist is entirely frank and honest as to both purpose and motive. The latter is especially true in such legitimate fields for propaganda as the Red Cross, or in such movements as the perfect-teeth, anti-boll-weevil, and better-sanitation campaigns. Those activities also illustrate types of propaganda in which there really is but one side to the question.

However, the term propaganda more frequently than not suggests an unethical and insidious sort of activity by means of which people are misinformed and misled. That is probably the inevitable result of the enormous and increasing use of the method for political purposes in Germany, Italy, and Russia, not to mention the United States. But whether for admirable or for degrading ends, the meaning and method are the same. It is most effective, of course, when not recognized as propaganda. If, for example, the horrible stories about the "Belgian atrocities" committed by the German soldiers had been recognized as mere propaganda, they would not have aroused the hate and other emotions requisite for promoting effective warfare against the Germans. If such stories leave a question as to their truth in the minds of the hearers, they are ineffective; so it is necessary first to

build up gradually an emotional readiness to believe the very worst about the enemy. Otherwise it probably would be impossible to incite civilized men to the murder and destruction involved in war. By propaganda the murder and destruction are camouflaged, perhaps by the pen of a poet who never saw a trench, into the "glory of battle" and "supreme sacrifice." On the other hand, if, on the occasion of a war, the bare, cold facts were handed out—that this many men will be killed, that many crippled and blinded, that it will cost this amount, and that if we win we will get this or that—and if no effort whatever were made to arouse emotion either for or against war, it is obvious that it would be very difficult to induce more than a handful of men to enlist. Clearly then, successful propaganda must seem a perfectly cool, detached statement of truth. If the people in process of being aroused discover that the propagandist is trying to stir them emotionally or to get a certain reaction from them, they will be antagonized and fail to respond.

Advertising is admittedly a form of propaganda; hence the advertiser's assertions are ordinarily not accepted at their face value. Some forms of education, notably instruction in such things as physical and mental hygiene, are also types of propaganda. But in neither advertising nor education is there any great danger of misleading people, since the former is recognized for what it is, and the latter is usually on a sound factual basis and in the hands of persons of integrity. It is rather the distorted information and interpretations disseminated by agencies organized perhaps solely for the purpose of promoting fallacious and prejudiced ideas that constitute the real peril. There is an increasing need in our educational program for definite information regarding the functions and

methods of propaganda, so that whether it is good or bad, for worthy or unworthy causes, it may be recognized by intelligent adults and evaluated in the light of such other information as may be available.

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CHAPTER VII

Psychology in Law

IT IS IN THE very nature of things that man-made laws should change. Laws come about only as the outgrowth of contacts between human beings—contacts that have been growing in complexity since man's first appearance, and require control. The relatively simple regulations that were once sufficient have been entirely outgrown. After killing Abel, all that Cain had to do was keep out of sight; he was not being hunted down. Moses was educating his people to higher legal standards when his limitation of "an eye for an eye and a tooth for a tooth" forbade their usual practice of killing off as many of the enemy as they cared to, and stealing or destroying as much as they could lay their hands on, in return for some comparatively trivial depredation committed against them. Now, not only may one not pay his enemy back on the "eye for an eye" basis, he may not pay him back at all, and stay within the law. Scientific psychology is one of the forces at work to make law more effective, and perhaps in time less necessary, both by prevention of delinquency and of crime, and by detection and correction of those who do break the law.

Causes of crime. Are there criminal types—people who have an unusually pronounced native tendency toward crime? Some careful students, such as Lombroso and Galton, answered affirmatively, while others, Mün-

sterberg for instance, replied in the negative. The best current thought on the subject seems to favor the latter view, but with certain limitations. While close-set and shifty eyes, a low and retreating forehead, and other marks popularly regarded as suspicious signs do not indicate a criminal nature, there are certain *physical* characteristics that do seem to make it difficult for some to avoid coming in conflict with the law. These might be called factors predisposing to crime, as a greater percentage of criminals than of the population at large are afflicted with these traits.

Some of these predisposing traits are defective mentality, which may prevent the individual from seeing anything wrong in what he is about to do; malfunctioning glands, which may lead to antisocial impulses beyond his control; mental disorder, of a type causing delusions that may drive him to revenge or self-protection; and emotional instability, which may lead him to crimes of an impulsive nature. But we should hardly consider these characteristics as constituting criminal types. The only evident physical characteristic that is unrelated to internal defects or to drives, and that differentiates criminals from others, seems to be that the men, on the average, are a little shorter. Obviously that is not a "sign" that can have any weight whatever for legal or psychological purposes, since there are plenty of tall criminals, as well as numerous well-behaved short men.

Though of course the hereditary personal equipment of the offender is an essential element in the situation, the weightiest factors leading to delinquency and crime seem to be for the most part *environmental*. Protracted spells of bad weather seem finally to remove desirable inhibitions or to arouse undesirable impulses. School children

are at such times harder to control; and infractions of law on the part of adults are more numerous. In cold weather, more crimes are committed against property, and in hot weather, against people. Congested areas where there is no place for children to play, and where adults are so packed together that every sort of unwholesome trait or impulse is aroused are responsible for much misbehavior. As a bright high-school graduate, a girl of seventeen living with her parents and brother, remarked recently, "With four of us in two rooms, all coming home worn out and discouraged after a day of useless job-hunting, no wonder we get on each others' nerves and fight." Yet many a larger family is crowded into much less space than that.

Although poverty itself is not a major cause of delinquency, it often predisposes to crime by necessitating living in an undesirable locality. However, the influence of the neighborhood may be counteracted by good home atmosphere; in fact, the home is the most influential single factor in determining character. While in the United States about one fourth of the children are in homes broken by death or marital difficulties, about fifty per cent of delinquents come from such homes. Bad companions are among the leading causes of crime. Boys are usually educated in ways of crime by companions their own age; girls are initiated by older associates.

The place of work is a more important influence on girls than on boys. Some commercialized amusements, too, are degrading in their effects. A number of careful studies have recently been made on the effect of movies, so that there is now much less need for guesswork concerning their influence. There is no doubt but that some are very helpful indeed in their educational value, as well

as decidedly good entertainment. But there is as little doubt that some are exceedingly bad; while theoretically they may be supposed to indicate that in the long run the way of the transgressor is hard, he may be portrayed as having a very satisfactory time most of that way, with money, ease, and adventure. Of course, the criminal is usually shown as down and out at the end, but the young spectator at the movie figures that he would not make mistakes; he would be more clever and shrewd and get away. And the lovely clothes of the somewhat disreputable heroine are enough to turn any girl's head. Moreover, the picture shows exactly the technique of committing certain crimes; how to cut out a window, to devise weapons with which to kill, to dispose of evidence, and so on. The number of ideas an attentive person can get at a gangster movie, for instance, is rather appalling.

Addiction to drugs or to intoxicants is a major cause of crime, and constitutes a more serious problem than most other types of misconduct. Continued use of drugs and alcohol results in mental deterioration and lessened ability to resist temptation. In addition to the disintegrating effect, it so lowers the individual's inhibitions and moral standards that he is ready to commit crimes he would never commit when in full possession of his wits.

Lack of opportunity for self-expression and lack of helpful motivation are influential but incalculable factors making for delinquency. Part of this is to be charged to inadequacy of the school and part to society as a whole, the home included; but it seems as though it might be one of the most remediable. The disintegrating effect of the purely external environment, like weather or place of work, might largely be prevented if in some way the individual had resources within himself. A wholesome

interest or hobby, ambition, and self-respect would tend to hinder his resorting to unworthy activities and forming bad habits. Perhaps it is the fact that the condition is a negative one that makes it somewhat intangible from the angle of lawmaking. It is responsible for getting certain individuals into the hands of the law, but it is not one for which the law feels responsibility. It is a situation that an enlightened public could handle in a constructive way through suitable schools, parks, libraries, and other public facilities. The positive state, the possession of bad habits like drinking and gambling, leading ultimately to conflicts with the law, is comparable to a disease that has to be cured by operation or medicine; while the negative state, lack of opportunity and motivation, is more like anemia and malnutrition, which predispose to disease, but before disease sets in may be remedied by wholesome food and other "normal" forms of treatment. In the interest of intelligent economy, if for no other reason, society should devote more expert attention to a solution of this problem. Although many communities are making very good progress in the matter, still more are continuing the old harmful and demoralizing methods of handling young offenders, while making no intelligent provision for prevention of delinquency.

Methods of detecting guilt. After a crime has been committed so stealthily that no one knows who is guilty, it becomes the duty of the law to detect the criminal. There are various methods, old-fashioned as well as new, used with varying degrees of success. Files of fingerprints and case records are valuable aids to the police in identifying the criminal, but have no relation to psychology. Sometimes the "*third degree*" method of extorting a confession from a suspect is called "psychologi-

cal," but a better adjective would be "inquisitorial." The person under suspicion is questioned unmercifully, threatened with all manner of abuse, and perhaps kept without food and sleep until he "confesses" even when he is entirely innocent. The "third degree" is an old method, still widely used, though in general disfavor. The justification offered for it on the part of its users is that hardened criminals sometimes find themselves incriminated by their answers, and finally give up and confess, when until then society was at a loss to discover the guilty one.

The *association test* is more psychological. In this test, to each stimulus word read to him, the accused is required to respond immediately and orally with the first word entering his mind. Embedded in the list are certain "key" words—words connected with the crime; should he pause when one of these words is read to him, look flustered, or make any apparent effort at concealment of his originally intended response, the evidence is almost as conclusively against him as if he gives some response that definitely incriminates him. The main defect of the method is that some innocent person may be so intimately involved in the crime and may know so much about it that his efforts to appear innocent look like guilt; while the actual and callous criminal may pass the test smoothly, and remain at its end merely a suspicious character.

Most of the *physiological methods* of detecting guilt are recent in origin. They involve taking measures of pulse, blood pressure, and breathing, simultaneously with the association test and other verbal responses in answer to questions. They operate on the principle that when one is emotionally stirred, as when telling a lie, his pulse and blood pressure fluctuate, and breathing becomes irregular.

When responding truthfully, one is not so upset emotionally, and pulse rate, blood pressure, and breathing remain more normal. But the "lie detector" is by no means widely used in court. In the first place, its results are not one hundred per cent accurate; and in the second place, many people feel that the criminal should be free to defend himself by his wits; that it is taking unfair advantage of him because, according to the Constitution, a person cannot be required to give evidence against himself.

The events occurring during the trial are indisputably matters of psychological interest. The characteristics of the accused, the varied types of people to be quizzed as witnesses, the types of questions asked, predilections of the judge, and bias or suggestibility of the jury, all pertain to psychology.

Reliability of testimony. One cause of unreliable testimony from honest witnesses is *incomplete* or *faulty perception*. Suppose there has been an accident. In its very nature it has been sudden and unforeseen, and hence the observers were not prepared to take careful notice. It has occurred with such speed that the eye, an organ relatively slow in functioning, has not seen it with any high degree of precision or completeness. It has been a more or less complicated event, and when many things happen "all at once," accounts given are bound to vary widely, possibly no one being either certain or correct in the matter of sequence of events. The factor of excitement in itself leads to inaccuracy. If some of the witnesses have themselves been involved, as in an automobile accident, they know their side of the case much better than they do the other, and however honest, tend to be biased in favor of themselves.

Another cause of unreliability is *faulty memory*. In a memory span test of only seven or eight digits, although the activity is a relatively simple one, and the individual is calm and prepared to give careful attention, his memory proves incompetent to retain all the digits. The average person will frequently omit, add, reverse, or substitute a digit or so. Hence it is easy to see how an accident or the commission of a crime could be not only inadequately perceived at the time, but inadequately recalled and reported on later. The lapse of time would dim some items and accentuate others.

The *personal qualifications* of the witness constitute another phase of the situation. Some witnesses who intend to tell the truth are actually reliable, but some are almost incapable of accuracy. In general, extreme youth and old age operate against exact reporting of events, as does also defective intelligence. The very intelligent witness is not conspicuously better than the average person, though somewhat so provided he merely tells what he has observed without attempting to interpret it. The fact that the witness reports the people involved as having been "trying to do" this or that, or ascribes to them certain motives that he could only guess at, constitutes a large source of error. Inability to estimate distances, speeds, or time intervals also causes accounts to vary widely. The relationship of the witness to the plaintiff or defendant is an important factor bearing on reliability of testimony, as is also any prejudice for or against him.

Even with honest witnesses who mean to give facts and misrepresent nothing, sworn testimony is more exact than is unsworn testimony. If a witness is "pretty certain" a thing was this way or that, that the door had been locked, or that the car was dark blue, but would not

take his oath on it, he is mistaken much more frequently than when he is willing to swear to the circumstances. The percentage of accuracy is also higher on accounts given spontaneously, that is, when the witness merely relates the circumstances of the case as he recalls them, than on accounts interspersed with questions, though the latter type gives a greater amount of information. If, for instance, a witness is describing an accident, he may not think to mention the color of anything until he is asked; but if he does remember to include it, he is more likely to report it correctly than if he is asked about it. However, there are many details that he is likely to omit until questioned, regarding which he can give sworn and precise testimony.

The question might fairly be asked as to how the degree of accuracy in any report can be definitely known. If reputable witnesses give varying or even contradictory stories of the same happening, how can it be known what the facts are? In many cases there is no way of knowing. But under controlled laboratory conditions, it can be determined. Experiments have been conducted in which a scene is staged in a classroom, showing an apparent quarrel between professor and student, or some type of accident. The whole act is planned and rehearsed beforehand. Then at the time of the occurrence, everything that is actually said or done is carefully checked by observers who know what has been planned, and by stenographers who write down what was actually said. Immediately following the act, the members of the class are asked to write an inclusive account of exactly what happened, or are requested to fill in an objective questionnaire on it. All manner of conflicting reports are given. Apparently the only way in which identical stories can

be obtained is to have the witnesses agree in advance as to what they will tell. If there is no disagreement whatever in the accounts, it probably would be safe to infer that the witnesses are dishonest, or at least in collusion.

The form of the question is of great importance from the viewpoint of reliability of testimony. A suggestive question, like "Did the pedestrian turn around when the car honked?" implies that there was a honk, when as a matter of fact possibly there would have been no accident had a warning been sounded. The witness may fall into the trap, genuinely "image" the honk, confuse it with a memory of the sound, and say he does not know. But thereafter he may be very sure there was a honk; and thus win the case for a reckless and dangerous driver. Some questions may be misleading or arouse prejudice. In fact there is almost no limit to the misinformation that may be evoked by clever and unscrupulous questioning. On the other hand, a clever examiner may confuse a lying witness and get him so befuddled that he fails to recall promptly enough which are the facts and which the lie, and so completely betrays himself.

The jury. Our antiquated jury system adds to the complication in regard to determining the facts concerning a crime. To begin with, the selection of the jurors is a procedure so unjustifiable on any scientific basis as to preclude attaching any serious consideration to their decisions. The jury is usually made up of a group of twelve individuals selected by lot from a list, or panel, drawn at regular intervals from the men and women of the local community. Professional people are usually excused from jury duty, leaving only the less intelligent and less trained portion of the population to serve. Each prospective juror may be challenged by the lawyer on

either side of the case as to fitness for giving impartial consideration to the evidence presented. The challenge may be on any ground whatever—race, religion, or occupation. Sometimes the entire panel is rejected, and another chosen. Since any opinion already formed regarding the case is cause for rejection, in some cases it is almost impossible to find any intelligent, alert citizen capable of using his own judgment to serve as juror. Anyone reading a widely publicized case, such as the Lindbergh kidnaping, or the Scottsboro trial, would almost inevitably have formed at least a tentative opinion, and so would be “unfit” for jury duty on the case. When at last the twelve jurors are assembled, the judgment of each is still colored by his own background of occupation, prejudice, and all that goes to make up his individuality, as well as by his interpretation of what each witness has said. Then, since a unanimous decision is required on each case, it is more than likely that a few members, and sometimes the majority of the jury, will ultimately be persuaded by one or two strong-minded or domineering persons to vote as they do. Some jurors are so suggestible as scarcely to have any minds of their own, and some so obstinate that their minds are closed in advance to any ideas except the ones with which they started the case.

Justice is further retarded by the fact that in the majority of trials, most of the jury sympathize with the accused. The writer was told by a highly intelligent young man in the midst of a term of jury duty that he was appalled at the standards of his co-jurors. They wanted to treat the accused as they would themselves want to be treated in like case. They all agreed that had they been in that sort of jam they would probably have

done the same thing, so why should they condemn the accused? In addition, any lawyer, by emotional appeals, can sway the jury as he pleases. The time will probably come when jurors will be trained for their work, for it seems logical that training is required to pick out the truth from a mass of conflicting details.

Prejudice and partiality may also influence the judge, even though he is technically prepared for his work. But many judges are known to be susceptible to certain types of appeal, or to prejudice. One judge will be very severe with drunken drivers and lenient with sneak thieves, while another judge will have the reverse attitudes. In setting the length of the jail sentence for petty crimes, one judge shows partiality for sentences of three months, while another in a similar case automatically pronounces "six months."

While judge and jury are presumably aiming at justice, the lawyer on the case is in quite a different sort of position. He is supposed to know the facts, and whatever they are he must convince the court that his client is in the right. While all public speakers have the same general problem, namely, to win the audience, in the lawyer's case it is intensified because usually there is more at stake. Some are very much more dependent on emotional appeals, or even melodrama, than others are, but the type of jury and audience largely determines the appeal used.

Treatment of the juvenile delinquent. One of the more encouraging aspects of legal reform is the changed attitude toward the young offender. As has been said, the best measures for preventing crime are suitable education, health supervision, playgrounds, and vocational and other opportunities for young people whose homes provide inadequate outlet for their energies. But when

problem cases do arise, and a boy or a girl goes beyond the bounds of the school's control, a genuine effort is often made by the court to correct the difficulty. The judge takes the attitude that it is a situation calling not for punishment but for reform, and not reform in the old sense that meant putting the youngster in a so-called "reform school" with a gang of hardened and older offenders, where he could improve his crime technique. The modern reform school is on the order of an unusually good vocational school. The child's physical condition, personality, and aptitudes are studied with a view to fitting him for a worthwhile and happy life, and an effort is made to displace bad habits with socially desirable ones. The Whittier State School of California illustrates especially well the effectiveness of training boys, rather than punishing them. Twenty-five years ago corporal punishment was freely used, and ninety-three per cent of the boys who had served sentences there committed crimes after being released, and were sent to prison. Now that the system involves constructive training and no corporal punishment, about sixty-five per cent make good after leaving the institution.

The modern trend is to use the reformatory mainly for the more refractory cases. Even then it is not labeled a reformatory, but an industrial school. In progressive communities children whose difficulties seem due primarily to vicious environment are boarded at public expense in foster homes offering a congenial and wholesome background, and not placed in a corrective institution at all.

One of the best recent steps in the direction of desirable legal reform is the development of the juvenile court. As has been suggested, it sometimes happens that the

first offense is really a sort of accident, due to a combination of circumstances so distressing to the young offender that he is unlikely to repeat it. The affair has been a shock of a kind calculated to inhibit further law-breaking. But naturally the law cannot ignore the offense completely, even though it agrees that the situation is not one for punishment. It is for this type of offender and for the very young delinquent that the modern methods of legal handling are especially valuable. The case is given a private hearing in the juvenile court, and the offender may be freed on probation. Thus he entirely escapes the shame and disgrace of a detention sentence, as well as the ideas for further misbehaving that he would be almost certain to acquire while in the typical reform school. Or if the offender has been sentenced and has served part of his time, he may be released on parole. Whether on probation or on parole, the boy is required to report at designated intervals to an officer who keeps in touch with his progress in adjustment and reinforces the boy's effort to make good. If, on the other hand, the delinquent is morally irresponsible because of any defect in his personal make-up—is feeble-minded, for example—an entirely different problem is presented. Both he and society then need protection, and he must be permanently detained. It is only with the help of trained psychologists and psychiatrists that such diagnoses can be accurately made. Hence the juvenile court has in its employ these experts to aid in working out the best methods of rehabilitation of young violators of the law.

Law enforcement. While there has been comparatively little conclusive scientific proof that punishment for violation of law has a restraining or preventive effect

on crime, still it is true that there are fewer crimes in proportion to the population in communities or countries in which the commission of an offense is followed by prompt discovery, arrest, conviction, and punishment of the offender, than in communities lax in the matter. A study by Hollingworth¹ gives additional evidence of this, although the fact that he used as subjects for his study college men and women, twenty-five of each, and a purely theoretical or academic situation, inevitably discounts the findings somewhat. He made a list of varying combinations of degrees of severity of sentence, certainty of being caught, being convicted if caught, and serving the sentence if convicted, and asked each student in his group to check the items that would serve for him or her as the greatest deterrent to crime. The strongest deterrent was either extreme severity of sentence, even though the chances of being caught were slight, or certainty of being caught and punished, even though the sentence were light.

Results substantiating Hollingworth's study were obtained in a city with a population of about fifty thousand, where an experiment in law enforcement was carried out. Disregard of traffic and parking regulations had become a serious problem. Not only were there many totally unnecessary accidents, but the local merchants were finding a pronounced drop in sales due to the fact that shoppers could find no parking space within reasonable distance of the stores. So the city decided to try out a policy of law enforcement, and let no one off if a fine was in order. A debutante's smile was to have no effect on the fine, nor was a big business man's blus-

¹ Hollingworth, H. L., and Poffenberger, A. T., *Applied Psychology*, pp. 317-323, Appleton, 1925.

ter. For the first offense the fine was to be only one dollar; for the second it was to be two dollars; but for subsequent offenses the penalty was to be much more severe. The coming policy was announced in advance, but a great many people assumed that it was merely a gesture, and on the first day of its enforcement parked, as usual, for all day under one-hour parking signs, or wherever else they cared to be, failed to stop at arterial highways, and so on. The first day the city's treasury was enriched by several hundred dollars, and incidentally many citizens were enraged. In the next few days many were fined for second offenses, and a few for third; but no one ventured beyond that. By the end of the week the city was a model of order, and almost no fines were being collected.

From this it would appear that the enormous chance in this country of not being caught, and of not being convicted even if caught, and of not serving the sentence if convicted, favors the commission of crime. Fear may be an undesirable form of motivation, but after all, it is better than none. If delinquents could be convinced that the present laxity were to be displaced by law enforcement, it would doubtless be very efficacious in preventing a good deal of lawlessness. It is not necessary that a sentence be severe; but it is important that conviction and punishment follow the offense.

Not only are Americans lenient with criminals, but they also seem to admire them. If the crimes are sufficiently hideous, the criminals claim the major share of front-page attention in the newspapers, and their relatives are offered contracts as vaudeville entertainers. In a recent Sunday issue of a big daily paper, the rotogravure section gave pictures of a northern lake resort,

the hang-out of a gangster who, until he was killed when being captured, was universally rated "Public Enemy No. 1." His father was written up as one of the guides about the place, showing the "museum" where his son's guns and other effects were kept, the bullet holes here and there, and the avenue through the trees named for his son after his death, ad nauseam. Small boys are to be seen everywhere with mock pistols playing gangster. Yet everyone knows that make-believe often paves the way for and leads to reality. A recent paper had an account, with pictures, of a legal hanging witnessed by not fewer than ten thousand people, rich and poor, men, women holding babies, children, the entire countryside, and hundreds of outsiders from remote states; all were there for that express purpose. It was a gala occasion, with hot-dog stands and ice-cream cones—nothing was missing to make it a lark. Some things are hard to explain. Would different laws and a different attitude toward them help any?

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CHAPTER VIII

Psychology in Advertising

THE FIRST FIELD in which scientific principles of psychology were applied was education; the next was advertising. However, advertising itself is about as old as mankind. When Abraham needed to buy a burial place for his wife, Sarah, he "stood up from before his dead" and let the sons of Heth know his requirements. Later in Hebrew history, when Naomi wanted to sell "a parcel of land," Boaz called together several of the leading men of the city, saying he "thought to advertise" them of the proposed sale. The Greeks and Romans used parchment signboards and public announcers to inform the community of gladiatorial combats and other events. The dissemination of information by the town crier was still customary in medieval times, especially in France, where crying was a well-established vocation. Our scissors-grinders and street vendors are reminiscent of these early criers.

In medieval Europe, occasional written notices were posted in conspicuous places, but not until the middle of the fifteenth century were printed advertisements used. Instead, the type of service offered was indicated by signs, such as a barber pole, or a large shoe or glove. An inn-keeper utilized any sort of symbol that struck his fancy, such as a white ox, a new moon, or similar device. Since the average man was illiterate, information necessarily

had to be conveyed by other means than writing. Trade-marks, too, are of ancient lineage, but were originally used rather as a guarantee of satisfactory workmanship than to advertise the maker. All of these are instances of advertising on a very small scale, but exchange of goods or of services was much more limited than now. Not until the beginning of the twentieth century was there any scientific experimentation in the field of advertising with a view to applying sound psychological principles.

Advertising on an enormous scale, national and even international, has been made necessary by mass production. Its essential nature has not changed, but it is vastly more complex than it was seventy-five years ago, before magazines and newspapers carried advertising matter to any great extent. Advertisements were almost entirely in black and white until about 1890, when color began to appear in appreciable amounts, though not until 1905 was as much as one per cent of advertising material in color. A little later the argumentative advertisement came into use, and in addition to setting forth the characteristics of the article, gave reasons for purchasing it. Much the same principle is used now in dramatizations and stories. The housewife who uses this particular brand of soap has *such* a happy household, with *such* fresh clean clothes, as compared with the haggard young wife not using it, whose husband goes to work wearing a dingy shirt, while the baby drags around in soiled rompers, and the older children are embarrassed because of "tattle-tale gray." Some man's life is entirely ruined because he does not use this special kind of tooth paste or automobile.

Whatever the means or method or extent of advertis-

ing, the main purpose has always been the same: to attract attention, impress the memory, arouse desire, and lead to action.

There are various reasons why advertising is used so extensively. The leading one is to interest prospective customers. It also paves the way for the salesman and at the same time supplants him; the less time he needs to "sell himself" and to argue for his wares, the more time he has to sell them, and the fewer salesmen necessary; and the fewer salesmen needed, the greater the profit.

To educate and to raise the standard of living are two other objectives of advertising. The first, to educate, illustrated by the Peaceways Bulletins, and by notices of clinics for babies or for treatment of tuberculosis, involves no commercial motive whatever. The second objective, to improve standards of living, like most advertising, is fundamentally and primarily for commercial purposes. It is illustrated by public utilities companies, advertising wiring of farms. They can not only sell current, but open the way for the sale of all sorts of electrical appliances. When a family has once had some of these conveniences, it is very hard indeed to give them up; thus a permanent and increasing market for current is automatically provided, and the standard of living is raised. In the meantime, the wants of the individual change; his primary needs no longer are consciously foremost, but his acquired wants gradually take precedence in his thoughts. He may mortgage the shelter over his head to buy a totally unneeded car or boat. His buying habits have radically changed.

There are arguments fairly to be urged against advertising on the present mammoth scale. It is exceedingly

expensive, costing hundreds of millions of dollars annually. It sometimes adds to the cost of the article, but in most cases, owing to mass production, it actually lowers it. A manufacturing plant often is equipped to turn out an almost indefinite supply, and if there is a demand for it, its production is profitable not only to the manufacturer but to many others. Employment is given in the plant to many more workers, a sales force is hired to move the goods, stores handling the product have an additional source of income, and so on, all without adding to the price of the article. It is advertising that creates this demand. As a rule, the consumer tends to overestimate the percentage of the price of the product that goes to pay for advertising, but there is actually a good deal of variation in that percentage. On automobiles, for example, it is about three per cent, while on many drugs it is thirty per cent; the average is approximately ten per cent.

Another criticism is that advertising creates a desire for luxuries. That is true and has weight. The wish to have what others are having, even though it is pure extravagance, is almost inevitable to some natures. But on the other hand, if those who can afford luxuries do have them, it gives employment to many who might otherwise be unemployed. If the extras take the form of hairdressing or manicuring, or of articles to be made, delivered, and cared for, the cash of the wealthier person is kept in circulation, and the purchasing power of others is increased.

Advertising is also attacked on the ground that it increases competition, making it necessary for all concerns to advertise. It does have that effect; a concern that does not advertise fails. But publicity also directs at-

tion to quality, and such competition, as a rule, very definitely improves the product or service being offered. When there is no competition, it is frequently true that the one man in the field can furnish very poor goods or service, and still make a good living. But if an enterprising competitor appears on the scene many will prefer to patronize him instead. It is only when competition becomes so keen that dishonorable practices are used that it is a serious disadvantage.

A comparatively minor argument against advertising deals with the defacement of highways, glaring lights, loud speakers, and other things trying to the nerves in general. Furthermore, billboard advertising placed on curves or at highway intersections may contribute to serious accidents by diverting the driver's attention from the road. But there are times when attractive highway advertising adds pleasantly to the interest of a dreary and flat section of country, and also gives helpful information regarding hotels, resorts, and other features of the vicinity.

The contention that there is much dishonest promotion of worthless and fraudulent goods or investments does not seem essentially to be an argument against advertising, but against deceit of any sort. If anything, untruthful statements in advertisements tend to be less pernicious than in other connections, because everyone expects exaggeration when a merchant or a manufacturer is telling of his product, and so should be on guard. However, it is not now considered good business to overrate a product too greatly, and strictly dishonest advertising is becoming much less frequent.

One argument in favor of advertising, not to be refuted, is that it makes available a large amount of read-

ing matter at very low cost to the buyer. The outstanding example of this is the *Saturday Evening Post*. The price does not pay for much more than the paper itself and transportation to the reader. While the advertising is not the ostensible offering to the public, still it does comprise from thirty to sixty per cent of the total bulk of the periodical, and contains much information of really educational value. What Hotchkiss calls "the high-water mark of national advertising" was the \$1,579,408 paid by advertisers in the December 6, 1929 issue of the *Saturday Evening Post*. That issue was very large, and 168 of its 272 pages were given over to advertising matter. With the business depression it has become markedly smaller, decreasing both its editorial material and its advertising copy.

Factors attracting attention to an advertisement. There are several factors effective in drawing attention to an advertisement. One of them is *color*, for though it has not been demonstrated conclusively that the use of color pays financially, it has been proved that its use calls attention to the advertisement. In commodities where color is important as an aid to the prospective buyer in making a selection, as in the case of clothes, it seems to have greater commercial value than when, as with foods, its function is mainly to make the picture more realistic. In a catalog put out by Sears, Roebuck and Company, on one page pictures of skirts in colors were presented, and on another page were pictures of skirts comparable in every way as to price, quality, and style, but without color; the colored page brought in ten times as great returns.

Another factor of advantage is *size*. Other things being equal, a full-page advertisement attracts more atten-

tion than a half page, and large print is more effective than small. However, another factor, *repetition*, tends to compensate for the advantage of size. A small advertisement repeated several times may have greater attraction value than a much larger one appearing but once. In fact, repetition—keeping a product, Campbell's soups, for example, constantly before the public—is one of the most effectual means of advertising.

Other important factors are *change*, or *movement*, illustrated by neon lights, in motion or flashing on and off; *striking quality*, as when unusual color combinations or odd figures and lines are displayed; and *novelty* of any sort, such as a comic advertisement, or a space empty save for a large question mark.

Factors impressing the memory. An additional important factor in effective advertising is conspicuous display of the *name* of the product, or of the concern making or handling it. Since the average time spent in looking at an advertisement is only a few seconds, if the name is not very much in evidence, it does not become associated in the mind of the reader with the product being publicized. While an advertisement in which the name is not prominently displayed may in a vague and indefinite way promote the product, it is unnecessarily ineffective. Whether the buyer is looking for collars, silverware, or peanut butter, the fact that he has a certain brand in mind when he goes shopping helps the business of the concern whose name is associated with the article.

Another principle that is very effective when well used is that of *fusion*, or *association*. To many people the word "cornflakes" means Kellogg's; and "camera" is synonymous with Kodak. Many articles essentially the same in nature and design, but with different trade names,

are popularly called by the original name that first labeled the commodity. The term "Frigidaire," for example, still is widely misapplied to any make of electric refrigerator. If all advertisers could get that effect, their competitors would be beaten before they started.

When, on the other hand, the advertiser mentions some unpleasant thing, even though announcing vigorously that his brand is free from that defect, the customer may associate the defect and this particular brand of goods and refrain from buying it. He may not know how or why he made that association, but it has been made. It is good advertising to associate a defect with a remedy for it, but not to associate defects with the product itself. Fusion may also occur between an advertisement and adjacent material. Placing an advertisement for a patent medicine next to an obituary column would probably not promote the sale of the remedy.

Factors arousing desire for the product. Various sorts of appeal are used in advertising. Some point out the merits of the product, such as the quality of workmanship and materials, and price; others convey the idea of personal or social benefit to the individual. Some of the appeals based on desires of the individual are to appearance, as with cosmetics or clothes; to recreation, with golf sticks or canoes; to health and comfort, with a picture of a serene housewife reading in an easy chair, while the electric washer does the work; to self-improvement, prestige, popularity, safety, parental love, and so on, ad infinitum. Some appeals are limited to certain groups of people, or to certain localities or seasons; others are practically universal in scope. A product may be written up at one time in such a way as to emphasize one value, and at another time other values. This is done on the

theory that, since a person's mood changes from time to time, and that since what attracts one mood, or one member of the family, may not attract another, as many aspects of the commodity as possible should be emphasized.

There are also positive and negative appeals. A positive appeal indicates the satisfaction resulting from following the advice given in the advertisement; a negative appeal, showing "pink toothbrush," perhaps, portrays the regret or annoyance due to ignoring the advice. Some advertisements use arguments, testimonials, and similar appeals to reason, while others merely suggest the situation by skillful use of pictures. A favorite method is that of showing the whole family, from grandparents down to the baby, rejoicing in Velvet ice-cream, or shivering because their house is not equipped with an oil heater.

Methods of determining effectiveness of an advertisement. Now that such enormous sums are being spent on advertising, it is essential that the firms paying these huge amounts know whether their money is being profitably invested; whether or not they are getting adequate returns from their advertising. One way to determine the strong selling points of an article before composing the advertisement is to ask experienced salesmen what features the buyers ask about: durability, fast color, style, or price. In some localities it might be one quality of the article, and another in other localities. The advertiser can then emphasize these points and get out his publicity to fit the community, playing up the quality most in demand.

There are several methods of determining the effectiveness of an advertisement or series of advertisements before spending vast sums on publicity. (1) Previous to putting the advertising material before the public, the

effectiveness of various types of presentation can be determined by experimentation in the laboratory. (2) A more usual though more expensive technique is to conduct test campaigns in different areas, using varied methods and types of appeal, and see which region shows the highest percentage of sales. The type of advertising used in that area would then be judged the most effective, and would be utilized on a wide scale. (3) Different types of appeal may be inserted in similar magazines or in different issues of the same magazine to see which appeal brings in the best returns.

Placing the advertisement. There are several considerations that enter into an advertiser's decision as to the advertising medium in which he shall place his copy. The most important are cost, number and location of prospective customers, and kind of product. There is a very wide range in all three. A billboard telling of a local enterprise, or a sign on a barn, truck, or spare tire represents very little expense as compared with an advertisement in the *Saturday Evening Post*, but it will also reach fewer people. The advertiser must know the class, number, and location of people reached by a particular medium. Overalls probably cannot be effectively advertised in *Fortune*, but could profitably be publicized in a farm paper. Products such as milk or fresh bakery goods, perishable and for strictly local distribution, may be publicized sufficiently by a sign on the store window or by an advertisement in the local paper. Pianos, books, and radios, produced on a large scale and intended for unlimited distribution, require more extensive advertising.

Examples of media varying widely in cost follow: window display, which often represents no additional ex-

pense to the advertiser, especially in small stores; hand-bills, usually costing comparatively little for printing and distributed by inexpensive labor, small boys, perhaps; samples, suitable for such things as chewing gum, soap powder, and breakfast foods, but not widely applicable; blotters or calendars, intended to serve as frequent reminders of such articles as fences or shoes, of which samples could not be given; circular letters and mail-order catalogs, which are among the most expensive but most profitable types of advertisement; radio, one of the hugest agencies; neon signs; and such minor types as sandwich-men, megaphone cars, and parades. This is not intended as an exhaustive list, but includes most of the media. The two most important, however, remain to be mentioned—the newspaper and the magazine.

There are several respects in which newspapers and magazines differ as advertising instruments. The three fundamental considerations—cost, customers, and product—all enter very definitely, but they are not the only factors. Set-up or appearance, transiency or impermanence of article or opportunity, arrangement within the medium, and speed of returns are all important differences.

Perhaps the first point of difference to be noticed is lack of color and artistic effect in the newspaper. Another important difference is the more extensive use in the newspapers of the classified advertisement, though some magazines use it for a few items, such as schools, somewhat on the order of a directory. But in the magazine, that type of advertisement, like practically all others, refers to things relatively permanent in character, while in the newspaper the classified section contains mainly items of a transient nature, such as personal ad-

vertisements, help wanted or offered, houses or apartments for rent or sale, second-hand furniture, and so forth. The advertisements may be there for a day only, or repeated over and over. In general, most daily advertisements concern temporary matters and things of purely local interest: church suppers, real estate, bargains, and the like. In addition, the daily paper can take advantage of a strictly contemporary event such as rain or a snowstorm, advertising umbrellas, sleds and overshoes on the spur of the moment. A merchant with a consignment of fruit or other goods can make his customers aware of it. In other words, people deliberately look through the advertisements in the daily paper just to see what is being offered that day. The advertisements in a monthly journal have to *attract* attention or they are likely to be ignored.

A factor of much importance in attracting attention in magazines is the location of the advertisement. In newspapers, position is of less importance, because the practice of classifying advertisements lets each have its own weight with little regard to its position or the proximity of other material. The most valuable positions on the magazine page are the upper left-hand corner of the left-hand page, and the upper right-hand corner of the right-hand page. They average more than ten times as effective as any other part of the page. The two lower inside corners are the least valuable. The right-hand page is more valuable than the left, and the upper half of any page more valuable than the lower. The back-cover page is the most expensive single page, and those just inside the covers are next in value. Advertisements adjacent to columns of reading matter are more effective than those with adjacent columns of advertising. Leaving much empty space around an insert increases attraction value.

Another difference between the newspaper and the magazine is that advertisers in the former expect immediate returns. The magazine, on the other hand, is likely to lie around for a month, and to be picked up now and then but not hurried over. The difference in treatment is well illustrated by advertisements regarding travel. In the daily paper, the train and bus schedules are given, or perhaps some travel agency may run an advertisement largely to remind the residents of the town of its services and to give them its street address in case an extended trip is in the offing. But the magazine advertisement pictures a lovely scene in Hawaii or Iceland, gives the advantages of this or that steamship company, portrays the delights awaiting the traveler, gives the name of the agency, and then just lets it all simmer. In the course of a month or so, perhaps the reader makes up his mind to investigate, sends a request for further information, and the trip is all but begun. If the advertisement had not been "good," he might not even have thought of an excursion.

Magazines differ among themselves almost as much as they differ from newspapers, the main point of difference having to do with the types of groups reading them. Hence some advertisements never appear in certain widely read periodicals, but are constantly found in others. A magazine like the *Ladies Home Journal* or *Good Housekeeping* carries a much wider range of advertisements than does a church paper. Journals read mostly by men advertise roofing, motor oil, and machinery rather than salad dressing and Lux soap. Farm magazines are notorious for the number of patent medicines they advertise. A trade or professional magazine carries technical material designed for its subscribers.

Of course, an advertiser cannot always know in advance

just which publications will serve his purpose best, but he can always find out quite easily by running the same advertisement at the same time in several magazines. The method is that of utilizing coupons. The reader is asked to clip out the coupon and send it to the advertiser, whereupon a sample of the product will be mailed him. All the coupons in one magazine, *Good Housekeeping*, for instance, are marked with one designation, such as "J2," and those in the *National Geographic* with "X4," so that the advertiser can know exactly which publication brought in the largest number of inquiries. If he gets almost no coupons from a certain journal, he knows it does not pay to advertise in it, no matter how large its circulation.

Trade names and slogans. A good trade name is one of the best selling points an article can have. A few of them are valued by the owners at upwards of \$20,000,000, and a good many at over \$1,000,000. Slogans such as "It floats" or "Ask the man who owns one" are selling features adding much to the effectiveness of advertising. Both name and slogan should be short and snappy, pleasing in sound, and unique. It is desirable for the slogan to refer to a quality of the article; otherwise it could be applied to a great number of commodities, not of necessity an automobile, but a cow, an incubator, an overcoat—anything. The prize money spent in securing a good trade name or slogan is obviously well spent if it results in a satisfactory name. But even if it does not, it interests many people and is reasonably good publicity.

Since trade names and slogans are so vital to the prosperity of a business, it is easy to see why an infringement is serious. If a catchy name or phrase can be so

closely imitated that the buyer is unaware of any difference, the imitator is saved a vast amount of money in advertising. The publicity for the original serves for him too. Such mimicking frequently results in a legal decision, sometimes that the second constitutes an infringement, sometimes that it does not. In certain cases that have been studied in the laboratory under controlled conditions, the percentage of confusion has been greater in non-infringement than in infringement decisions. Illustrative of that situation is the case of *Pep-tenzyme* vs. its imitator, *Pinozyme*, which, in spite of forty-three per cent of confusion, resulted in a ruling of non-infringement; while in the case of *Noxall* vs. *Non-X-Ell*, with twenty-eight per cent of confusion, the second was legally declared an infringement.¹

Salesmanship

Closely related to advertising and having the same purpose—to induce someone to buy the product one has for sale—is salesmanship. While advertising depends primarily on persuasion by means of the written word, selling is ordinarily carried on by the spoken word. It involves a direct personal contact between seller and buyer, and hence is attended by all the advantages and disadvantages that personal contact entails. One distinct advantage is that the salesman can aim his appeal directly at the prospective customer, and can use one method of approach to the timid old lady, and another to the confident young office girl. Moreover, the sales-

¹ Paynter, R. H., "A Psychological Study of Confusion between Word Trade-Marks," *Bulletin of United States Trade-Mark Association*, May, 1915.

man can change his appeal in the course of the conversation if it appears desirable to do so, whereas the advertiser must compose his appeal once and for all. The salesman has the added advantage of being able to answer objections and give additional information, but the advertisement must stand as it was originally stated. The fact that the customer may be attracted or repelled by the appearance and manner as well as by the actual words of the salesman constitutes a distinct advantage if that impression is favorable, but may be a liability if it is not.

Some people are by nature better adapted to the work of selling than are others; that is true of any vocation. And under some circumstances little real salesmanship is required; the customer will buy the pencil, handkerchief, and mucilage that he entered the store to purchase if the salesman will just produce them. But when the supply of goods to be sold greatly exceeds the demand, as during a depression, and in selling intangible things such as insurance, selling powers are taxed to the utmost. It is under these conditions that the difference between the good and poor salesman is most evident.

One of the most careful and thorough studies of the qualities possessed by salespeople of varying degrees of success was that made by V. V. Anderson, Director of Medical Research at R. H. Macy and Company's department store. His study showed clearly that the most important single characteristic distinguishing the best salespeople is extroversion. The extrovert meets people easily, talks fluently, and enjoys working with people. Anderson found that over forty per cent of the fifty "best" clerks studied were definitely extroverted, and only ten per cent introverted; whereas of the fifty "worst"

clerks almost half were definitely introverted, and less than twenty-five per cent really extroverted. The best fifty had more initiative and were also more aggressive, convincing, ambitious, alert, and pleasant than were the fifty poorest. These qualities appear necessary in the severe competition of busy city stores, but possibly are less imperative in a small town store.

Neatness and attractiveness of appearance above a certain minimum contribute practically nothing to selling efficiency, nor does high intelligence. Of five hundred salespeople at Macy's, seventy-five per cent had I. Q.'s between 80 and 110, and only five per cent were above 110. Selling insurance, or complicated machinery that must be understood, makes a heavier demand on intelligence, and salesmen in these lines are superior intellectually.

Selecting salespeople who have the requisite personality and ability for selling is not enough to insure their greatest efficiency. At present it is the exceptional firm employing salesmen either in stores or on the road that does not give them specific training for their work. Inexperienced salesmen need instruction as to how to approach customers and break down "sales resistance." Methods and styles of approach vary so widely that there are comparatively few rules to be laid down. Courtesy is a dominating note at the moment, and certainly is of major importance. Thorough familiarity on the part of the clerk with the wares offered for sale, and belief in their quality also add to his effectiveness. The salesman who is enthusiastic about his goods can convince others very much better than can the one who has only half-hearted belief or complete lack of confidence in the wares he is trying to sell.

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CHAPTER IX

Psychology in Efficiency

RECENTLY A PROFESSIONAL man about to give an address on the subject of efficiency asked a small group of friends if any of them considered themselves one hundred per cent efficient. No one replied in the affirmative, but it was not because of modesty. A capable and conscientious young business woman said, "I'm not, and I shouldn't want to be. I don't care to have nervous prostration." Of course one who was one hundred per cent efficient would not have a nervous breakdown—that would be proof positive of inefficiency. What is meant by personal efficiency, and what conditions are of importance in securing it?

This is an age in which a great deal of emphasis is placed on efficiency. Indeed, the word itself has been badly overworked and has acquired a variety of connotations, some of them definitely unpleasant. It is easy to understand why that should be so; some people seem rather aggressively competent, with an air of managerial oversight for their associates and of complete self-sufficiency for themselves; some are thrifty to the point of cluttering up the house with every bit of paper, string or whatnot that could by any conceivable possibility "come in handy" on some remote occasion; others plan every moment of their day; and incidentally in carrying out their program all these people may irritate and an-

tagonize their associates. But this is not being efficient, though isolated suggestions of it are present here and there.

Genuine personal efficiency has a positive and a negative aspect. On its positive side it implies a fairly complicated program of activity, well organized, and executed to the satisfaction and pleasure both of the individual and his companions. On the negative side it implies a minimum of irritation, friction, nerve strain, and waste effort.

The problem of efficiency can be approached from two angles: that of the work and that of the worker. From the point of view of industry, efficiency has to do with matters of production, such as elimination of accidents, of waste of time and materials, and improvement of the morale of employees. The individual and the work he does cannot be wholly separated in one's thinking or in the economic treatment of them. If the efficiency of individuals in a manufacturing plant or a mercantile establishment is low, then the efficiency of the organization is low also. Workers who are unsuited to their tasks are unhappy and create economic problems. Physicians in charge of hospitals for the treatment of mental disorders assert that many of the patients are in their deplorable condition because of intolerable elements in their work. On the other hand, those very elements may be exactly what some other people enjoy the most; they are contented and valuable to their employers. These individual differences make it evident that adjustments between worker and work cannot be stereotyped or handled en masse. Naturally that creates complexities; it would be far simpler if all human beings were alike, and if when ten men were needed for a certain task, any ten men

would do. That has been more or less the usual assumption for generations, but now the employment manager or the personnel director of any big concern has a task of large dimensions in adjusting worker and work. The efficiency of the plant necessitates the efficiency of the worker; and, as has been pointed out, personal efficiency involves personal satisfaction and enjoyment, as well as achievement.

Factors Affecting Efficiency of Work

The problem of efficiency is met not only in business and industry, but by anyone who works—student, factory hand, housewife. There are three types of conditions involved in work: the environmental or external elements, the psychological or mental factors, and the physiological make-up of the individual. Obviously there is a close relationship among them.

Environment. Environmental surroundings of a physical sort consist of atmospheric conditions, light, noise, equipment—whether convenient and adapted in size and other respects to the needs of the user—suitable rest periods and rest rooms, and all other external conditions contributing to the good or ill of the worker.

Investigation as to the effects of *atmospheric conditions*—temperature, humidity, and ventilation—gives facts somewhat at variance with the usual popular beliefs. It is commonly supposed that occupants of an unventilated room with temperature above the optimum 68–75° F., and with humidity in excess of about fifty per cent, suffer discomfort and have lessened capacity for work as a direct result of the condition of the air: it is not only too warm and damp, but has a somewhat in-

creased carbon dioxide and decreased oxygen content. However, experiment shows that when air in a tightly sealed chamber is both so warm and so foul as to be giving great discomfort to the people within the room and having an unfavorable effect on performance of mental work, the introduction of a fan which stirs the air, thus permitting evaporation of moisture from the skin, removes the discomfort and restores the work level. Although under the unpleasant conditions of work the subjects are able to do approximately as efficient work, and at times do as well on mental tasks as when the air is in active circulation, they are greatly disinclined to work, and accomplish little unless they put much conscious effort into their performance. Further evidence that efficiency and comfort are determined by the condition of the surface of the body, and not by the proportions of oxygen and carbon dioxide in the air, is given by another phase of the experiment. When subjects seated in a room with satisfactory atmospheric conditions are required to breathe through a tube inserted into a container with abnormally high carbon dioxide content and reduced oxygen, they suffer no discomfort. When on the other hand the subjects are in the overheated and unventilated room, and the air furnished through the tube is perfectly fresh, they immediately show ill effects.

Investigation into the effect of *light* that is insufficient, too direct, or poorly distributed shows the unquestionable advantage of correct lighting. The effect of increasing the number and size of factory windows, and even of washing those that are soot-covered, has been to increase production, as has also better supply and arrangement of artificial light. Light-colored walls also contribute noticeably to improved efficiency and com-

fort, especially where black or dark machinery is used. A large post office saved considerable money in salaries by increasing the light enough so that the clerks could more easily see to sort the mail.

The effect of *noise* is more uncertain, though on some points there is agreement among investigators. Until workers become accustomed to the noise in or near their place of work, their performance is measurably affected by it. A typist in a noisy room may work as rapidly and accurately as in a quiet room; but she will pound harder, thus using more energy and creating more fatigue toxins. Numerous studies have demonstrated the physiological cost of working in a noisy room, especially when the noise is intermittent or variable. However, when the noise is constant, workers become negatively adapted to the situation and may show no effects from it.

Psychological factors. By psychological factors are meant such things as attitudes toward work, aptitude for it, motivation, remuneration, fair treatment from superiors, annoying or boring elements, and such social considerations as having enjoyable companions while at work. These factors are fundamentally of greater importance than the environmental conditions. If most or all of the psychological factors are satisfactory, the worker can rather readily put up with his working conditions unless they are extremely bad. It is with problems along these psychological lines that personnel managers are mainly concerned.

Physiological factors. Some of the physiological factors involved in efficient work are relatively permanent, some are temporary. Examples of the more permanent ones are eyesight, and the general state of the worker's health, whether frail, average, rugged, or decidedly vari-

able. It is evident that general physical condition has to be taken into account when work of any description is under consideration. There are numerous things a person in delicate health can do, even in the industrial world; but the frailty has to be recognized in assigning or selecting the work.

Some temporary factors have to do with conditions of depletion of the fuel supply, as in hunger, or with accumulation of toxins created within the body, as in fatigue and loss of sleep. Others, such as tobacco, coffee, and intoxicants, are introduced from without, and hence are much more amenable to control both by the individual and for experimental purposes. If an individual does not want effects from them he can avoid them completely. There is much popular disagreement regarding their influence, some people claiming to find certain ones helpful and others negligible or harmful, while other persons hold opposing or conflicting views.

Loss of sleep, hunger, and fatigue are almost universally accepted as having effects detrimental to efficiency under ordinary circumstances; but if the condition is not extreme there need be little resultant loss either in quantity or quality of work. That is especially true in laboratory investigations, where the individuals being experimented with, aware that an experiment is under way, ordinarily put more effort into the activity and overcome their inertia. Of course, increased effort cannot be kept up indefinitely without decline in efficiency.

Outside the laboratory, however, *fatigue* can be studied and observations made without those concerned knowing anything about it. Figures as to time and frequency of accidents illustrate that. Statistics show that in factories, after fatigue has set in, accompanied perhaps by

carelessness due to monotony, the number of accidents increases steadily until about eleven o'clock, when the accident curve drops. After lunch the accident curve again rises steadily, but, as in the morning, drops just before closing time. The decline in accidents typical of the approach of quitting time is probably due in some instances to a decrease in speed as the workers get increasingly tired; reduction in the rate of work results in fewer accidents. In other cases, the drop in the curve may be due to an "end spurt," or increase in efficiency; the workers know they are about to leave their work, and so feel encouraged and under less strain. That end spurt is typical of all sorts of activities—athletics, housework, school work. It illustrates how well the body can offset fatigue if there is motivation. Praise likewise has the effect of spurring on to greater effort regardless of fatigue.

One method of reducing the effect of fatigue is the introduction of rest periods, best illustrated in industry by the experiment with workers in the Bethlehem Steel Company. The investigator ascertained the average daily output of the men before any experimenting began. The work observed was moving by hand 92-pound blocks of pig iron. The men carried each pig a few feet and placed it in a railway car. This was all piece work; each man was paid for what he moved, the average being 12.5 tons daily. Rest periods of varying lengths and at varying intervals were introduced by the experimenter. This was under protest from the men: naturally they did not want to sit around and waste their time when on piece work. However, they were required to stop at a signal, rest, and resume work at the next signal. After considerable trial-and-error experimenting, the best combi-

nation of work intervals and rest periods was determined, with the result that, although carrying iron only forty-two per cent of the working time, the average man moved 47.5 tons daily. Furthermore, he was not so tired at closing time. It is not only in heavy manual labor that rest pauses before fatigue sets in are valuable; experiments with women working in garment factories show the same thing to be true. Investigation has been extensive, and examples might be multiplied indefinitely.

Although there has been a great amount of study on the general question of industrial efficiency, almost no psychological attention has been given to that of the farmer. Schools of agriculture and other research agencies have contributed helpfully to gathering and disseminating information regarding crop production, stock breeding and feeding, and other problems of the farmer; but the actual farm work has received practically no consideration. However, since agriculture is easily the leading industry in this country as far as number engaged in it is concerned, it deserves some analysis.

Why not apply to farming some of the information that careful study has given as to hours of work in relation to output? The ambitious and industrious farmer and his wife put in longer hours than could be justified in the industrial world on any efficiency basis. Instead of starting work perhaps at eight, having an hour off at noon, and quitting at five, the average farmer starts at daybreak, whenever that is, has an hour off at noon, stops at dark, and then "does the chores." When they are finished depends on the amount of stock to be fed and number of cows to be milked. Of course in the winter his working hours are automatically shortened by the hours of daylight and the absence of growing crops; they

are then only about as long as in other occupations. This fortunate circumstance gives the farmer a chance to rest and fortify himself for the long hours of the growing and harvesting season.

The following example of an informal experiment in agriculture in many ways parallels the experiment at the Bethlehem Steel plant. One fall in an Irish-potato-growing section in the north there was an especially heavy crop to be harvested, but it was not ready as early as usual. Hence the annually recurring danger that the crop would freeze before it could be brought in was increased. The potato pickers were in unusual demand, and there was a shortage of them. So one farmer, who had imported from nearby a small group of Indians—as many as he could get—to pick up his potatoes, decided, in the interest of getting his entire crop in if possible, to try “scientific principles” on his crew. Instead of the local sunrise-till-sunset program, he decided to have his men start work at seven, have the usual noon hour, and quit at six. His neighbors predicted trouble: his potatoes would freeze before they could be harvested if he worked such short hours. Since potato-picking is on a piece-work basis, the Indians wanted to start at dawn and work even after dark with lanterns. But “the boss” was adamant. Not only would he not let them work except at the stated hours, but he also made them stop and rest at the end of every so many rows, at times handing out cigarettes to make the rest periods more acceptable. The daily average on his farm was about twenty per cent higher than that of the best of his neighbors, and the morale of his men was excellent.

However, apart from any scientific demonstration, when an individual works for a good many hours over-

time, day in and day out, it stands to reason that his efficiency is being reduced by the overtime. He drags one foot after the other, and putters about for an hour or so doing something that should require only a few minutes. Furthermore, in his fatigued state he uses an entirely disproportionate amount of energy, and so has that much less as the day wears along, and is obliged to put forth more and more effort doing things that should require only a trifling energy outlay.

This is not intended to imply that farm work can or should be distributed evenly throughout the year, or that cows can be educated to observe clock time; it merely suggests that since the farmer's working day begins at daybreak, he should take time off during the day. If he "rested" intelligently it would undoubtedly pay him in dollars and cents, as well as in enjoyment of his work and of some of the other things that make life worth living.

The effects of alcohol, caffeine, and nicotine on efficiency have been subjected to rather extensive laboratory experimentation. It has been especially necessary to use objective measurement because of the many conflicting subjective estimates of their effects. That is particularly true of *alcohol*. It is popularly taken as a stimulant, since from a superficial and uncritical viewpoint it seems to "stimulate" good cheer, talkativeness, and other social qualities. However, it actually is a depressant, affecting successively the different levels of activity. It first affects the cortex of the brain, the thought areas, making the individual less critical and hence freer in speech and conduct, and more ready to be entertained with vacuities. It next acts on the centers concerned with motor co-ordination, thus making the

gait uneven, the hands unsteady, the eyes incapable of focusing—in short, making impossible any accurate motor control. As the depressant effect continues, the individual falls asleep. However, it is only with moderate doses that laboratory experimentation is concerned. All studies of the effects of alcohol show a decrease in mental and motor test scores, in steadiness, speed, and resistance to fatigue. Recovery of motor functions is slower than that of other capacities. The implication of this for handling any sort of machinery, including the automobile, is obvious.

Tobacco, as everyone knows, has much less effect on work than has alcohol. Many of the accusations against it are based entirely on prejudice, but even so, there are a few more scores against it on an efficiency basis than there are for it. All investigators find an increase in tremor of the hand and consequent decrease in motor skill following its use. It seems to have no appreciable effect on mental activity or efficiency where mere laboratory experimentation is involved. However, there is entire agreement that smokers make lower marks in school than nonsmokers. A study on the campus at Clark University showed that sixty-eight per cent of a group of nonsmokers as contrasted with eighteen per cent of a group of smokers made "honor" records academically, while an investigation at Yale showed only five per cent of a group of "high honor" students to be smokers. All other studies substantiate these as to general trend.¹ However, there is very little difference between smokers and nonsmokers on intelligence-test scores, which suggests that the difference in school marks is not due to a

¹ See also *The Student Who Smokes*, J. R. Earp, Antioch Press, 1926.

difference in mental ability, but to other factors. On the secondary and elementary school levels, on the other hand, the smokers are definitely lower in intelligence as well as in marks. Their inferiority, however, cannot be charged to use of tobacco, for they scored lower in both respects before beginning to use it.

Caffeine, the active drug found in coffee, tea, and some soda-fountain drinks, has more pronounced immediate effect than has tobacco. It increases hand tremor and also speed of motor reaction. Probably because it is a stimulant and makes one more alert, it speeds up the learning process. Of course the stimulating effect varies with the amount of caffeine, and with the degree to which the individual is accustomed to its use. The main deleterious effect seems to be that it contributes to insomnia under some conditions, but comparatively little scientific attention has been given to that point. Some think that its effect on sleep is due merely or mainly to suggestion, but the evidence indicates that suggestion is not the full explanation.

Student Efficiency

Turning our inquiry to the campus, what conditions do we find contributing to the student's efficiency or lack of it? No new principles are involved. However, the student is in a slightly different situation from that of any other worker in that the returns from his labor are almost purely intangible at the time, may be very remote, and perhaps never remunerative. While his efficiency is evaluated objectively by the teacher, the student often disagrees with that evaluation; sometimes he

knows it is too high, sometimes too low. But the average student wants to be efficient; he wants to get his work done satisfactorily to all concerned, and not to injure his health nor irritate his associates. Furthermore he does not want his work to interfere with his having a good time. How can he manage to be fully efficient?

The primary requirement, academically speaking, is a degree of intelligence and of preparation that will make it possible for him to do his work acceptably. His health and personality should preferably be such as to contribute to his efficiency, or at least should not detract from it. His attitude toward his work should be intelligent; that is, he should consider that, for the present, being a student is his vocation, voluntarily undertaken, and to be carried on in a manner consistent with his self-respect.

Another characteristic the student particularly needs is ability to concentrate. His life is peculiarly full of things that distract from the main issue. While all callings have distractions, in the case of the student they constitute a vital part of the vocation itself. It is accounted the student's duty to take part in various kinds of extracurricular activities. If he protests that he does not have time for them, that he must study, he is accused of being without school spirit, disloyal, and just a useless grind. In other callings, that is not the case. The manager of a business concern that has a ball team made up from among the employees does not expect any of them to let their work suffer in the interest of athletics; but campus public opinion seems to demand it. Yet all these distractions—athletic, religious, literary, forensic, and social—are an essential part of college training; a student par-

ticipating in none of the activities outside the classroom would lose a very great deal that can be obtained in no other way. The problem is how to cope with them; not how to avoid them.

In order to be efficient, a student must have the right sort of habits. Nothing can take the place of them, and anyone without them can acquire them. Nowadays, budgeting is the correct beginning whether money, time, or energy is under consideration. Hence the student who wants to succeed needs to budget his time and get himself so well organized personally that most of the necessary daily routine activities will more or less take care of themselves. That involves formation of habits: regularity of hours for meals and sleep, for study, for recreation, and for such outside activities as athletics, literary work, or dramatics. Unless a student wishes to be thought "queer," he should arrange those hours to correspond approximately with those kept by others. A student who sleeps at all manner of times, studies in snatches, eats scraps whenever he can lay his hands on them, loses much himself and has a demoralizing influence on others.

A regular place to study is of great importance. That does not mean that the student should be so lacking in ability to concentrate that he is helpless if someone else chances to be in his favorite spot in the library. But in his own room it is a conspicuous saving of time and effort if he has his own desk with all necessary equipment right at hand so that he has no excuse to be constantly interrupting his thoughts by needless breaks. Since he does not habitually sit at his desk when intentionally idling or when reading light fiction, sitting at the desk can shortly come to mean that he is getting to work, and will condition the work attitude.

The question is frequently raised as to whether one should be comfortable when studying. With only one exception the answer is in the affirmative: if the student goes to sleep the instant he is comfortable, by all means he should be uncomfortable if he has to study; otherwise he should be comfortable. Discomfort is always a distracting force; distractions necessitate increased effort, which leads to fatigue; both distraction and fatigue make concentration difficult and lead to inaccuracy. Figure it out for yourself: suppose your feet are cold; or your head aches; or there is an unpleasant lump of some sort on the chair you are occupying; or your belt is too tight, or the desk too high; do any of these things contribute to your efficiency while studying? If anything is a source of distraction, it should be corrected if possible and forgotten. Study arrangements should be such that one can get to work either immediately or after some such trifling adjustment as moving the lamp to a suitable position.

It is unnecessary to go into the effect on students of inadequate food, sleep, or light, or of alcohol, coffee, and tobacco. These have the same implications for students as for other workers. Fatigue might perhaps be used to illustrate the application of one factor of efficiency to the student's problems. In industry, as has been said, rest intervals contribute materially to output. They are just as valuable in the student's calling. After studying a reasonable length of time, perhaps two hours or thereabouts, it would be well worth while for the student to take an intermission of five or ten minutes, leave his desk, and really relax. If he takes that time deliberately, but keeps his general work attitude (mental set for study), he can go back to work for another hour or two much more profitably than if he had worked continuously. If,

on the other hand, he fails to take the time out, he may perhaps almost waste the last hour or so by being too tired to do anything satisfactorily.

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CHAPTER X

Child Psychology

Early contributions to child study. Not until comparatively recent times has scientific attention been directed toward the field of child psychology. But ever since there have been children, there have been theories about their nature and how to modify and direct it. Plato, three hundred years before Christ, seems to have been one of the first to advocate specific techniques of training. He took account of individual differences when prescribing various types of subject matter and different lengths of training periods for young men according to whether they were to be artisans, soldiers, or philosophers. He recognized early impressionability, arguing against the use of Homeric poems because of their sanction of immorality among the gods, and against nursery tales because of their untruthfulness and condoning of deceit. He called attention to the effect of different types of music, favoring the Dorian with its invigorating and martial rhythm, and opposing the Phrygian and other relaxing and gentle airs. The Jews, even in Old Testament times, recognized the importance of training their children; they required every boy to learn a trade, and maintained strict family discipline. "He that spareth the rod" in disciplining his children was an example of one who was storing up trouble for the future.

From time to time through the centuries there have been

religious or educational leaders with fairly clear-cut doctrines as to the handling of children, but until the time of Comenius (1592–1671), who introduced the idea and use of pictures in textbooks for children, very little recognition was given to the child as a distinct type of human being. He was merely a miniature adult, with the same traits and interests, but in greater or less degree. With Locke (1632–1704) and Rousseau (1712–1778) the school world became more aware of the importance of the child's early years. Locke wrote the first treatise to have as its main concern the education of the child. While his emphasis on "a sound mind in a sound body—" the opening words in his essay *Some Thoughts Concerning Education*—was wholesome and valuable, his theory of educational discipline, especially as it was misinterpreted, exaggerated, and misdirected, contributed to the retention of harshness in the school, and to the sanctioning of uninteresting methods. Such expressions as occur later in the treatise, "children should be used to . . . go without their longings even from their very cradles," and his suggestion that "inuring children gently to suffer some degrees of pain without shrinking is a way to gain firmness to their minds," though not intended for general use, did nevertheless tend to dominate educational thinking and procedure unpleasantly both in the school and in the home. However, the fact that he actually considered the child essentially different from the adult, and prescribed for him, was an important psychological contribution.

Rousseau's *Emile*, based not at all upon knowledge of children, but merely a visionary analysis of development, attracted much attention because of the directions given for training Emile at each stage of his childhood and youth. Much of it is entirely impractical, but it had

merit in that it directed attention forcefully to the importance of the early training of the child.

However, not until Pestalozzi's time (1746–1827) did the school really begin to make concrete provision for the child as a child. Pestalozzi was greatly influenced by Rousseau's *Emile*, and undertook to put its principles into practice in the schoolroom. He held that the child develops from within, and that his natural impulses and interests should be the guide of both teacher and parent in their efforts to instruct and control him. Pestalozzi's influence was very wide-spread, educators from all over the world coming to his schoolroom in Yverdon, Switzerland, to study his methods. He vigorously opposed the contemporaneous theory that the child is naturally predisposed to sin, and held the equally erroneous view that the child is naturally good. But since his opinion inevitably pointed to love as the best means of control, the school became a much happier place.

In 1837 Froebel (1782–1852) founded the kindergarten, with its play and handwork, its music, stories, and nature study. Ever since then, better schoolroom practice has adapted itself to child psychology and needs, at least on the primary level.

The novels of Dickens (1812–1870) were another source of influence contributing materially to the modification of educational practice. Dickens made no effort to analyze the child, but by portraying so vividly the child as he really is in his reactions to cruelty, kindness, and other types of treatment, the novelist reached a public quite indifferent to scientific findings regarding children, and almost unaware of the existence of problems concerning them. From then on the child had popular and political as well as academic champions.

Methods of child study. Probably the earliest effort at the systematic study of children is Pestalozzi's *Journal of a Father* (1774). It is one of the earliest examples of the *diary* method, a detailed and accurate recording of consecutive events in a child's development. Several others, including Darwin (1887) and Binet (1890), observed and recorded the activities of their children.

These studies afforded valuable data and definitely advanced knowledge and interest in the field; but they were, of necessity, so dependent on the interest and competency of the observer, so unstandardized, so likely to be colored by sentiment, and so uncritical and anecdotal, that they left much to be desired from the scientific viewpoint.

Another type of approach designed to throw light on childhood was the *questionnaire* method used by G. Stanley Hall. It depended for its accuracy, where infancy was being studied, on the competency of the parents; and when small children were involved, on their ability to reply adequately. Like the diary method just described, it was an effort in the right direction, but hardly scientific. That is also true of the *autobiographical* method used by Hall, Pierre Loti, and others, in which an effort was made to recall their early experiences and reconstruct their childhood. This method is probably the least valuable of all. The biographer is virtually certain to become sentimental, and to interpret incidents on an adult level, and perhaps also to falsify items through entirely innocent visualizing. All these methods contrast strikingly with the present concern for methodology and accuracy of observation regarding every detail of the child's life and behavior, not only in his early school years, but in his infancy and even in the prenatal state.

The methods in use today, without exception, require

the observation of children by a competent experimenter and trained helpers. In some instances, a child or a group of children is studied for a certain period of time, perhaps for the first twelve months of life, in order to discover the order of appearance of various abilities, or to trace their development. An excellent example of that type of approach, referred to occasionally as the *longitudinal method*, is a study made by Shirley and Boyd, the former a psychologist, the latter a physician. They observed and tested twenty-four babies for one year, following twenty of them for one and one-half years, and sixteen for two years, in an effort to trace the development of mental, motor, and social traits. They measured the children daily during the first week at the maternity hospital, then on alternate days the second week, and weekly thereafter in their homes. After that for the first year the children were measured bi-weekly. Size, health, motor co-ordination, sensory development, speech, interest in toys and other objects, and personality traits, all came in for notice and analysis. The fact that the children were studied in their own familiar background, with as little foreign or artificial element introduced as possible, adds to the value of the work. This group was superior, as would be anticipated in view of the maternal co-operation required.

Another example of a similar approach, but with the comparative element added, is the work of Dr. and Mrs. Kellogg, using as subjects their 10-month-old son, Donald, and a 7-month-old chimpanzee, Gua. In *The Ape and the Child* the Kelloggs describe the methods and results of the nine-month experimental study of the two playmates. They were treated in exactly the same manner as far as was possible: both wore clothes, both were re-

quired to eat with a spoon, both were kissed good-night. By the end of the experiment, when Gua was 16 months old and Donald nearly 19 months, there were several points of close resemblance due to environmental influences, as well as abilities in which one was definitely superior to the other. Gua surpassed Donald in facility in eating with a spoon, in bladder and bowel control, obedience, sympathy, and speed of learning. Donald excelled in skilled manipulation of objects, capacity to give sustained attention, ability to imitate, and showed less fear of strangers and greater self-reliance. They were equally affectionate in their treatment of each other, but Gua, in addition to the play spirit, showed a greater tendency to run to Donald either to give or to receive comfort in times of stress. Sometimes she was almost maternal in her attitude toward him.

Another type of study, sometimes called the *cross-section method*, involves periodic rather than continuous observation, either to compare development at different ages or to find out merely what constitutes typical behavior at a given age. An illustration of this technique is the extensive, accurate, and detailed work of Gesell at the Yale Psycho-Clinic. In one elaborate undertaking he engaged the co-operation of the mothers of normal, representative babies of different ages, and housed each child-and-mother pair for short periods each month in a photographic dome enclosed with a one-way-vision screen. He took a "naturalistic film" depicting the complete daily program of the child—bathing, dressing, eating, and so on. In all he took 3200 action photographs in his aim to establish norms of various sorts for each age level and so to trace growth and development.

One other method of study, the *training method*, should

be mentioned, though it is used in scientific experimentation much less than the others. Because the child is so impressionable it seems undesirable to try out unusual or startling things, or to use pain as motivation. Watson's experiments in conditioning a child to be afraid of a previously enjoyed white rat illustrate the method, as also do certain current experiments with identical twins—the so-called “co-twin control” method. One twin is allowed to develop in his own home with just the usual care and attention to be found in it, while the other is taught to roller-skate, climb ladders, and do all manner of tricks unusual in one so young. Perhaps one is required to “act like a little gentleman” and the other is allowed greater freedom. The problem in such studies is partly to discover the relative roles played by heredity and environment, but even more to see to what extent “forcing” is possible or desirable. Is a child so stimulated at a permanent advantage, or does the other twin, as soon as he is mature enough, catch up with the trained one? Or is the stimulated child at a disadvantage, owing to the forcing process? These and many other questions are not yet fully answered, though it is certain that forcing is possible.

One reason for giving so much attention to children of pre-school age is that development is much more rapid then than at any subsequent time. The child is impressionable and learning rapidly; hence practically all desirable habits should be not only started but well established during that period. Neatness, courtesy, truthfulness, or their opposites, as well as most other virtues and vices are well under way as lifetime habits by the time the child starts kindergarten at four, not to mention school proper at six. In his first two years he changes

from a squirming, helpless organism to a walking, talking individual; and by the end of the next two years he is ready to run simple errands, pick up his toys, and play with other children—in short, to take his place in the family or social group in a fairly adequate way.

Some of the more practical and utilitarian movements and agencies today that promote more competent rearing of children and wider dissemination of knowledge about them, are Child Guidance Clinics, where parents may come with their problems; Parent-Teacher Associations, which link the home and the school in helpful understanding and co-operation; Mothers' Clubs, for mothers of pre-school children; free Health Clinics, nursery schools, and publications such as the *Parent's Magazine*.

Characteristics of Children

What are some of the facts discovered in these studies, especially as to traits present at different age levels, and development of abilities and functions? There is no real reason for selecting one trait rather than another for discussion, but certain phases of sensory, motor, mental, and social development have been arbitrarily selected, omitting other aspects of personality, such as emotions, health, imagery, speech, and specific abilities.

Sensory abilities. Since sensory and motor capacities are apparent in the child at birth, it is logical to consider them first. A creature without sensation could probably learn nothing, and without motor ability could give no evidence of knowledge. A number of questions regarding sensation appear pertinent. Does the child have sensations before birth? Of what sensations is he capable at birth? Granting the possibility of certain sensations,

how do they compare in keenness with later sensory ability? Is hearing, for instance, as keen at birth or before as it is ever to become, or does it develop with maturity or practice? These and scores of other questions have been asked and answered. The answer to the first question is in the affirmative: the child does have sensations before birth, but it is not known with certainty of exactly what sensations the human foetus is capable. It is unlikely that smell is possible, because the nasal passages are filled with the amniotic fluid; and vision also is improbable because of lack of radiation, and taste because of lack of stimulation. However, the mechanisms necessary for each are ready for activity at birth. It is certain, owing to movements of the foetus upon stimulation, that pressure and hearing are experienced. It is a matter for speculation whether such organic sensations as hunger, thirst, and fatigue are present in the prenatal state. However, since a baby born prematurely has sensory capacities, it seems reasonable to assume that any sense organ could function prenatally if it could be stimulated. In other words, the organism is ready, but stimuli are absent.

There are evidences of *vision* shortly after birth: several eye reflexes, such as the pupillary reflex, occur upon stimulation, as do also such acts as blinking, fixation and following with the eyes a moving light. The eye movements are at first unco-ordinated, each eye tending to operate independently of the other. By the end of the second month, however, eye co-ordination is practically complete, both eyes following a moving object, rather than perhaps only one, with the other eye remaining stationary.

Hearing, which is second in importance to vision, is probably, as has been said, present before birth. Sharp noises and even music sometimes seem to cause the foetus

to move markedly. It is certain that movement follows the noise consequentially, but conceivable that it is the vibration rather than the sound that arouses the response. There is much variability among new-born babies during the first two or three days after birth, some apparently being almost or quite deaf, others seeming very alert to noises. In general, babies are sufficiently insensitive to noise to make it usual for them to ignore and even to sleep quietly through ordinary household sounds, without any necessity for whispering and tiptoeing on the part of the family.

There is some uncertainty on the part of investigators as to sensitivity to *taste* and *smell*. When salt, sour, or bitter solutions are placed on the child's tongue, he makes a wry face, which is interpreted to mean that he dislikes them; and when given a sweet solution he appears gratified and sucks it appreciatively. The doubt is as to whether he can differentiate among the three undesirable tastes. Does he merely "not like" any of them, and "like" sweets? Regarding smell, there is much disagreement, some holding that the child's avoiding reaction to ammonia and acetic acid, for example, is due to pain rather than to olfactory stimulation, since he rarely reacts at all to pleasant odors like perfumes; others hold that olfactory sensitivity is fully developed.

All the *skin sensitivities*, thermal, pain, and touch, are present at birth, but they are relatively dull. During the first few days, comparative insensitivity to pain stimuli is normal, but very marked and prolonged insensitivity is sometimes indicative of defective mentality.

Little is known regarding the *organic sensations* of infants. But since crying often occurs when the child is known to be in need of food or sleep, and since quiescence

follows gratification of the need, it is likely that some type of accompanying sensation is there, whether like that of the adult or not. Of course crying occurs as merely one of many activities, such as squirming, and waving arms and legs; it may not, of necessity, indicate discomfort of any physical sort. But the intelligent baby soon learns that crying is the activity that brings satisfactory attention from adults, while waving of arms and legs usually brings no response. However, since crying is in the first place an unlearned reaction to discomfort, it is probable that very shortly after birth, hunger and similar conditions are accompanied by discomfort.

Motor abilities. At birth and before, most of the child's motor activities are reflex in nature, or purely random. The neural paths for the *vital reflexes*, such as breathing, heart beat, and digestion, are, of course, able to function at birth. Another motor capacity of the new-born child is that of *sucking*, a complex act involving at least lips, jaws, tongue, cheeks, and throat. The stimulus may be something placed in the mouth; or a mere finger touching the cheek may lead the infant to turn his head toward the finger to get it in his mouth, in the meantime beginning sucking movements with his lips in readiness for the finger when he acquires it. Like other unlearned but somewhat complicated activities involving striped muscles, sucking becomes more efficient with practice. The *grasping reflex*, evoked by placing a small rod or pencil in the child's hand, is so strong at birth that the average infant can support his own weight with either hand for several seconds. This reflex weakens very soon.

At first, successful *voluntary movement* is impossible. The child's hands do not go in the direction in which the eyes seem to want them to go, except by chance. But by

the age of three months the child can usually direct his hand accurately to an object he is looking at, though his movements are jerky and unco-ordinated. The process of co-ordination is very slow, coming as the result of maturity rather than practice. Not until adolescence is co-ordination complete; hence drawing, dancing, running, and all other motions involving maturation are rarely graceful, co-ordinated performances much before maturity.

The movements that culminate in locomotion develop very gradually. When lying on his stomach, the child can lift his head at the age of three or four weeks, and his chest at about eight weeks. At six months he can sit with support, and by nine months without support. He then begins to creep, and by twelve months is standing with support. By fifteen or eighteen months he is walking alone, sometimes as much as a mile in the course of the day, and climbing stairs. From then on it merely requires increasing maturity and practice for him to learn to run, skip, and dance.

Mental development. What are some of the earliest manifestations of "mind" on the part of a child? His very early sensorimotor reactions, such as giving attention to a moving light in his field of vision, and lifting his head, as well as certain purely reflex actions, if "normal," are usually interpreted as having good predictive value for all types of development, including mental. But there is so much variability among infants in physical development that one should not attach too much significance to unusual behavior, whether favorable or discouraging. In general, however, an active child who is constantly trying to investigate his environment, whether by reaching for things or observing what is about him, is developing faster

mentally than a lethargic child content merely to lie still by the hour.

By the time the child is six months old, one can be reasonably sure what mental progress he is making. He looks for objects he has just dropped, puts blocks into a cup, smiles at his acquaintances, and in many other ways shows a real knowledge of his environment. He is by no means a being reacting in a purely mechanical way. Beginning to talk at an early age is the best single index of superior intelligence, just as undue slowness of speech is one of the most disheartening signs. The very gifted child begins to talk perhaps a month before he is walking, while the average child usually has been walking two or three months before he is saying more than a word or so. Language is symbolic and requires a fair degree of mentality.

Social capacities. The child shows no social traits at birth nor for some time thereafter. The unfolding of his social self is comparatively slow, and does not prepare him for handling complex human situations until he is fully mature. His first distinctively social act, due apparently to his first awareness that there is a difference between human beings and the other elements in his environment, is smiling at the sound of a human voice or on seeing a person. This occurs at about the age of three months. At this stage it apparently does not matter whether the tone or expression is pleasant or surly; the child responds with a smile. A little later he tends to reflect the mood confronting him, but by about eight months he again smiles at any expression of his companion, evidently assuming if the latter appears to be cross that a joke is intended.

Until he is about six months old, a child pays little or

no attention to another baby, seeming not to observe it; but after that time definite notice is taken of persons of any age. The type of contact made with another infant, whether offering a toy or making an attack, depends largely on the child's temperament; but at least it is a social encounter. The reaction of one baby to another is not at all the same as the reaction of a baby to a piece of furniture or even toward a pet. However, there is practically no co-operation between children under the age of two years, and very little, except under constant surveillance, for the next two years. Children of two and three enjoy play with adults much more than with each other. They enjoy watching and tagging around after others, but not playing with them in any co-operative way. If they are playing in a sand box, for example, they are playing independently—not "together" in any proper sense of the term. One does occasionally see a maternally-minded child of two and a half or three years protect and mother a younger or smaller child, but very rarely play with one. Until the child is old enough to grasp the idea of mine and thine, whether with regard to property, such as toys, or to taking turns, co-operative play is impossible.

While children of five and six still very much enjoy playing with adults, they also enjoy playing together, but not if competition or rules enter in. Not until the age of about seven or eight can they play games amicably without adult supervision. But shortly thereafter, with the onset of the realistic period manifested by imitation of high school and college ball teams, Indians and cow-boys, or ladies calling, no adult intervention is usually required or desired. Of course the training the child has

received and is receiving is a major factor in determining whether his social reactions are acceptable.

Only from eight or nine to twelve or thirteen is there a marked division of the sexes for social purposes. Little children are indifferent in the matter, and teen-age children are beginning to be attracted by those of the opposite sex. Play is the social enterprise par excellence, but by adolescence there are many other fields for social intercourse, such as clubs for literary or religious activities.

Maturity and practice are unquestionably necessary for satisfactory social development, and in addition other human beings play a vital part. Such characteristics as courtesy, poise, and fairness come about almost exclusively as the result of training plus contacts with people, whereas the world of things is sufficient to develop mental and motor capacities.

As was stated earlier, although the child has many other aspects of personality, these four have been selected mainly because they are basic. The discussion of them is admittedly incomplete, but it should suggest the enormous possibilities of research and the vastness of already acquired information in the field.

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CHAPTER XI

Animal Psychology

Contributions to animal psychology. Less than forty years ago, anecdotes about pet animals as a source of accurate knowledge of animal behavior were discarded in favor of the more reliable method of experimentation. The scientific stage of animal psychology may be said to date from the publication in 1898 of Thorndike's studies of the learning behavior of chickens, cats, dogs, and monkeys. This pioneer work is important partly because of the techniques, such as the problem box, which he invented; partly because he demonstrated conclusively that laboratory experimentation on animals was feasible; and partly because of the theories of learning which he devised to account for animal learning. Since these early studies, animal psychology has come to occupy an important position in its own right. Almost every basic problem that has been attacked in the field of human behavior has also been attempted with animal subjects. As psychology has recognized the importance of understanding the entire series of living organisms instead of human beings alone, the volume of research has been multiplying steadily. A count of the number of studies of animals in *Psychological Abstracts* for two recent years gave a total of over six hundred titles, and the number is increasing annually.

One motive for studying animal psychology is the desire to understand animal behavior per se: to observe how animals adapt themselves to controlled environmental conditions; to note how they react to sensory stimuli; and to trace the development of unlearned tendencies, such as the pecking response in chicks, flying in birds, and early sex behavior in rats. The ability of animals to learn and even to form concepts has likewise been investigated under carefully controlled conditions. On the whole, investigators in their experimental studies of animals have been less interested in gaining knowledge of a given animal as such than in solving certain problems.

Probably the most important contribution from animal psychology consists in evidence on basic psychological questions. Numerous problems that cannot be adequately solved with human subjects may be successfully attacked when animals are used. The effect on learning of a diet deficient in various vitamins, for example, can be studied far more easily with animal than with human subjects. The role of the endocrines in regulating activity and learning ability may be investigated by removal of glands or by artificial administration of hormones. An experimental approach to the problem of cerebral localization of functions, investigated by removal of portions of the cortex of animals, is revolutionizing our concept of brain mechanisms and of neural functioning. These problems necessitating operative or other interference with physiological processes could never have been attempted with human subjects. Another advantage of using animals as subjects is that unlearned tendencies can be distinguished from acquired behavior more readily in animals than in man. For example, the sex activity of the rat from birth till death can be rigidly controlled and kept

from or provided with external stimuli at the will of the investigator in a way impossible with human beings.

Hypotheses arrived at from study of human beings have been tested by animal experiments and verified. To mention one instance, studies with animals were devised to test a theory of educational psychologists that a given amount of learning time was more effective when distributed in decreasing amounts with increasing intervals between practice periods, than when taken in a few long practice periods spaced close together. Studies of learning ability at different ages, of the two sexes, with varied rewards and punishments, and studies of inheritance of abilities are more easily made with animal than with human subjects because of greater ease of controlling conditions, and because of the more rapid rate of growth and greater fecundity of the animals. With the exception of those definitely requiring verbal responses, almost every basic investigation in human behavior has been paralleled in simplified form with animals.

Suggestion of new problems and of new methods for human psychology is a scarcely less important contribution made by animal psychology. In any list of significant discoveries of recent years, Pavlov's discovery of the process of conditioning, first brought to light in the investigation of salivary secretion in a dog, would surely find a place. This discovery of the mechanism of the conditioned reflex has opened a new field of experimentation and given a new explanation of learning.

Because of certain peculiar advantages for laboratory experimentation, the white rat has been most extensively used in animal studies. It is small, clean, and easy to handle, and inexpensive to feed and to house. The large litters are an advantage in the many problems requiring

experimental and control groups comparable in age, sex, and heredity. There are several litters within a year, each maturing in about three months, so that studies of inheritance involving many generations can be made in a comparatively short time. Since the initial use of the white rat in psychological study in 1890, when Small investigated the learning by rats of a maze modeled after the Hampton Court maze, more than a thousand studies of the behavior of the white rat have been published.

Sensory discrimination. Since animals cannot make language responses, it is possible only by their gross muscular movements to tell that they are influenced by a stimulus, or capable of distinguishing between two stimuli. Two chief methods are used in animal research to discover whether an animal is capable of responding to a particular sensory stimulus: by establishing a conditioned reaction to it, and by the discrimination method.

In establishing a *conditioned reflex*, the animal is conditioned to respond in a particular way to a particular stimulus. In the following example, salivary flow is produced by a tone of a particular pitch by repeatedly presenting the tone and giving food at the same time. When the animal is thoroughly conditioned, that is, responds by secretion of saliva to the tone presented alone, a note of a different pitch is introduced unaccompanied by food. At first this new tone elicits the salivary reflex just as does the original tone, but after a number of presentations of the new tone without repetition of the original stimulus (food) the reaction disappears. Eventually the animal always responds with salivary flow to the original pitch, but never to the tone which was introduced later in the series. When this distinction has been made, it is obvious that the two pitches do not

sound the same to the animal, and that he has the ability to distinguish between these two notes of different pitch. At this point, other tones gradually approaching the original stimulus in pitch are introduced unaccompanied by food. When the two stimuli are too close together in pitch for the animal to distinguish between them, the conditioned reaction breaks down, saliva flowing when either stimulus is offered. By the conditioned-reflex method it was shown that dogs are able to distinguish between tones of 800 and of 812 and 825 vibrations a second. Another experiment demonstrated the ability of a dog to distinguish between a circle and various ovals approaching the circle in size and fullness. Discrimination was present when the axes of circle and ellipse were in the relation of 7:8, as evidenced by flow of saliva when the circle was shown, but none when the ellipse appeared. When an attempt was made to have the dog distinguish between a circle and an ellipse whose axes were as 8:9, discrimination broke down completely.

The *discrimination* method is more widely used in animal research than is the conditioning method. In the visual field many experiments dealing with discrimination of brightness, size, color, form, and distance have been performed. Experiments on brightness are typical of the method common to all, and indicate something of the difficulties encountered in attempts to measure discrimination in animals. In the discrimination box, the animal is required to turn into an alley marked by the brighter of two lights to secure food and to avoid punishment. It looks across an electric grill at two lights on either side of a partition. If it chooses correctly it is allowed to proceed without hindrance to the food box, but if it makes an incorrect choice, the door into the food

compartment remains closed and the animal is given an electric shock and forced to return to the starting point for a new trial. The positions of the positive and negative stimuli are alternated in irregular order so that the animal does not learn to go to the same side in every trial. When it is able to distinguish between the two stimuli with an accuracy of from eighty to one hundred per cent for thirty to fifty consecutive trials, discrimination is regarded as established.

But many factors must be taken into consideration before it can be assumed that the animals are differentiating on the basis of brightness and of brightness alone. Odor of one path as compared with the other, warmth from the light source, sound of the apparatus, position habits (always running to the right or to the left) must be ruled out as possible sources of the discrimination. Furthermore, if the stimulus is visual, blind animals should not be able to learn the problem. Moreover, animals which have learned to respond correctly in a large proportion of trials should become confused if the two stimuli are made equal in brightness: if they fail under these new conditions it appears that their previous reactions were based on true brightness discrimination. These are but a few of the conditions which must be controlled in adequate investigation of even so simple a problem as this.

Using modifications of the apparatus described above, investigators have found brightness discrimination in fish, mice, white rats, chickens, rabbits, raccoons, cattle, dogs, and monkeys. The length of the training period, which varies from twenty to five hundred trials according to the animals used and the experimental situation, is one of the great disadvantages of the use of the discrimination

method of investigating the sensory processes of animals.

Color vision has been demonstrated in a number of animals, but little is known of the details of sensitivity to color. Fish have been trained to snap at food held in forceps of one color and not to snap at food in forceps of another color. Apparently monkeys and apes have color vision similar to that of human beings. Moreover, two colors which are complementary for human beings are likewise complementary for the monkey; that is, when complementary colors are mixed, the monkey cannot distinguish between the resulting gray and other neutral grays. Color vision has been demonstrated in chickens, pigeons, and even in certain invertebrates. The honey-bee possesses a well-developed color sense, and gives evidence of reacting to the phenomenon of simultaneous contrast. Bees were trained to seek food at a spot marked by a ring of blue paper. Then a gray ring on a yellow background presented without food was substituted. The bees flew at once to the gray ring, indicating a phenomenon analogous to simultaneous contrast in human vision, in which gray on a colored background becomes tinged with the complementary color. Similar results have been obtained with chickens. There is no good evidence of color vision in rats, cats, dogs, or cattle when cues from the experimenter are eliminated; a bull would be no more likely to chase a red rag than a gray of equal brightness.

Problems of motivation. Recent studies stress more and more the importance of motivation. If animals are satiated, or if no food reward is given, learning does not take place. One of the important problems in conducting learning experiments, therefore, consists in providing for adequate motivation. There are two related factors in

motivation: the internal, or the drive; and the external, or incentive—the food or electric shock. The *drive* is a state of the organism which modifies and directs its behavior, such as the hunger drive, thirst drive, or sex drive. While all drives are predominantly physiological in character, even in animals some are greatly influenced by social factors.

The desired degree and kind of motivation can be obtained by regulating the time interval since eating, drinking, and so on. The longer the period of deprivation, the stronger the drive, provided that the starvation period is not long enough to lead to physical weakness. The hungrier the rats, the fewer the trials necessary to learn a maze or a brightness discrimination. Rats which have just been fed make little progress regardless of the incentive used. A hunger drive resulting from a twenty-four hour period of food deprivation leads to the most efficient learning in rats, a longer period involving weakness and enervation resulting in less activity on the part of the rats, and a shorter period producing a drive too weak for greatest efficiency.

An interesting experiment by Bayer¹ shows that degree of hunger is not the sole factor in determining the amount of food eaten, but that the environment, particularly the social environment, has a surprising effect. Bayer found that hens that have eaten until satisfied will start eating again repeatedly when the remainder of the pile of grain is quickly swept away and replaced, many hens eating two thirds more than ordinarily. A hen which has eaten to satiation will begin to eat again when a hungry hen is placed before the heap of grain, often eating more than

¹ Moss, F. A. (Editor), *Comparative Psychology*, p. 95, Prentice-Hall, 1934.

fifty per cent additional grain as the result of the social stimulus. The additional amount eaten is further increased if three hungry hens are introduced. But in the converse experiment in which three hens are allowed to eat until satiated and a fourth hungry hen is introduced, the three pay no further attention to the food. Evidently the three form a social unit unaffected by the isolated hen. This experiment indicates the effect of social stimulus in facilitating animal drives—a relatively unexplored field as yet.

Incentives, the external factors in motivation, are of two kinds—reward and punishment. Reward ordinarily consists in satisfaction of a drive, as food offered as the incentive to hungry animals, water to thirsty ones, or a male to a female in heat. The reward must be appropriate to the drive in order to be effective, for a thirsty animal will not learn if rewarded only by dry food; nor does water appeal to the animal deprived of food but not of water. Punishment consists in a pain-producing stimulus, such as an electric shock upon entering blind alleys in a maze or the wrong alley in a discrimination box. Sometimes the punishment consists merely of a brief detention after a wrong choice before a second trial can be made.

Investigators have been interested in studying the relative effectiveness of punishment and reward, as well as the efficiency of different degrees of punishment and reward. Most studies show that learning in the white rat is facilitated more by punishment than by reward, but that learning is most rapid when correct responses are rewarded and incorrect ones punished. Hungry rats not rewarded by food show little increase in efficiency in repeated trials in a maze. Several studies comparing the

efficiency of three or four degrees of electric shock in training rats showed that the smallest number of trials were required by the animals receiving a medium degree of shock; too strong as well as too weak a shock was less effective. It is evident from the above discussion that incentives play a very important role in learning.

Experiments in animal learning. Learning consists in modifying reactions through experience. Some degree of learning capacity is present in organisms of all positions in the phylogenetic scale from unicellular organisms to man. There is a close correspondence between complexity of structure and degree of learning capacity. Several factors prevent the correlation between position in the phylogenetic scale and ability to learn from being perfect. One of these is the extent to which some types, especially insects, are dominated by instinct. In a relatively simple, stable environment, instinctive behavior suffices, but where the environment is changing or complex, adaptation on the instinctive level fails, and the death of the organism ensues. Ability to adapt behavior to the demands of the environment is most evident among mammals, and investigation of learning phenomena has been confined largely to mammals.

While most experimenters agree as to the behavior of the animals when learning, and as to the facts of learning, they disagree somewhat on the interpretation of these facts. Three explanations of the learning process are most frequently given: conditioned reflex, trial and error, and insight. The methods of investigating learning fall into three groups corresponding to these three interpretations of learning, since the experimental setup influences the animal's behavior and consequently the interpretation of that behavior. The typical methods of studying ani-

mal learning are conditioned-reflex technique, problem box (trial and error), maze (trial and error), roundabout (insight), and multiple choice (perhaps insight).

The method of learning demonstrated by Pavlov, known as the *conditioned-reflex* method, has already been briefly described.

The use of the *problem box* in animal experiments was initiated by Thorndike in his classic experiment with cats. He confined the hungry animal in the box and placed food outside, presenting the cat with the problem of escaping by manipulating a button or other simple device within the cage which opened the door and allowed access to the food. Some problem boxes are constructed so as to have the food inside the box and the animal outside. In one device of this sort designed for rats, stepping on an inclined platform on one side of the box causes the door on another side to open. Learning in the problem box setup is typically random, or by trial and error.

The *maze* ordinarily consists of a winding pathway from starting point to food box, complicated by blind alleys or culs-de-sac. A hungry rat placed for the first time in the starting compartment begins to run about the alleys, sniffing at the walls and examining the surroundings thoroughly, going into numerous blind alleys, but ultimately reaching the food box. On successive trials it gradually eliminates the blind alleys and chooses a more direct route to the food box. After many trials the rat runs directly to the food upon being placed in the starting box.

Investigations involving problem boxes or mazes as the learning problem almost invariably conclude that learning is of a trial-and-error, random sort, in which the

correct response is hit upon only by chance. These techniques have been criticized on the ground that as the problem was arranged, it was impossible for the animal to survey the total situation, and that consequently only trial-and-error solution was possible, since only by chance could the animal happen on the correct solution.

Köhler, one of the leaders of the Gestalt school of psychology, has been particularly vigorous in his criticisms of the methods of experimentation of Thorndike and other American investigators. To obviate the difficulties in these types of experimentation, Köhler has devised the *roundabout* method.

Experiments of this type are devised in such a way that the animal can survey the entire situation, and if it has the ability to do so, can understand and react to the relationships involved. An experiment performed by Tolman and Honzik¹ using the roundabout method showed that when white rats are allowed to survey the situation as a whole, they show insight, that is, they give evidences of having grasped relationships between the various elements of the situation. The apparatus, shown in Figure 1, consisted of an elevated-pathway maze, the "alleys" made of narrow wooden strips without side walls, raised several feet above the ground so that the animals would not attempt to jump off. The rats were given preliminary training in the apparatus to set up in them preferential tendencies toward the three pathways to the food box. A comparatively small number of trials sufficed to make the animals prefer path 1, the shortest route to the food box. In order to force them to use one of the other paths, it was necessary to put block A in path 1.

¹ Tolman, E. C., and Honzik, C. H., " 'Insight' in Rats," *University of California Publications in Psychology*, Vol. IV, pp. 215-232, 1930.

This barricade forced the animals to return to the forking of paths and to take either path 2 or path 3. Of these two, the rats preferred the shorter, or path 2, as indicated by the fact that of 1,357 runs made by 15 rats with block

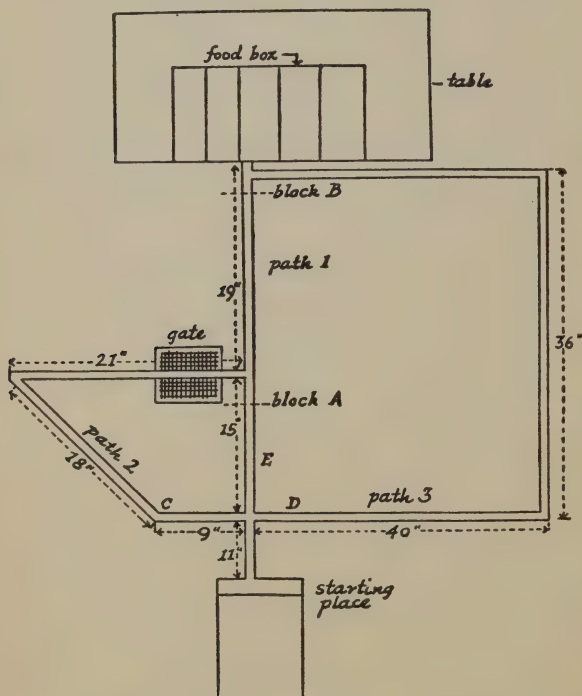


FIGURE 1. GROUND PLAN OF ELEVATED MAZE USED BY TOLMAN AND HONZIK.

A in path 1, 1,229 (90.57 per cent) were by path 2, and the remainder by the longer path 3. The preliminary training made clear the following tendencies on the part of the experimental animals: to prefer path 1, the shortest, when all paths were open; to prefer path 2 when path 1 was blocked; and to avoid path 3, the longest.

At this stage, the test to show whether the animals showed insight was made. In this test, block *A* was removed and block *B* inserted. The animals placed at the starting point went over path 1 to block *B*, where they were forced to turn back to the bifurcation. While the preference in the training period had been for path 2 as compared with 3, if the animal showed insight he would choose path 3, for block *B* closed path 2 as well as 1. Fourteen of the fifteen rats took path 3. This choice was interpreted as showing insight on the part of the experimental animals. Choice of path 3 by practically all the rats is the more significant because of the previous preference for either of the others over path 3.

From this experiment it appears that white rats are not limited to trial-and-error learning in all situations, but that they are capable of perceiving relationships when the experimental setup allows them to view the situation as a whole. Failure of a group of rats trained by the same experimental procedure, but in a maze with side walls that cut off the view of the remainder of the apparatus, offers support to Köhler's contention of the necessity for opportunity to survey the entire situation.

Solution of the *multiple-choice* problem, like the round-about, involves ideational manipulation rather than sensorimotor or position habits. The multiple-choice apparatus consists of an entrance box opening into a large reaction chamber from which a number of doors open. The animal is required to respond to some constant relation between the open doors by entering the correct one. If an animal enters the wrong door, he is confined or given an electric shock; if he enters the correct door, he is allowed to proceed directly to the food box. For example, doors 1, 2, and 3 may be open and the animal required to enter the door at the right, 3. Or doors 4, 5,

6, and 7 may be open, of which 7 would constitute the correct choice. This problem is solved by rats in from 170 to 300 trials. The problem may be complicated by requiring the animals to select the second from the right or left end, or the middle one. Problems as difficult as this were not solved by any rat within 1,000 trials. There is so far no evidence of ideational or symbolic processes in the solution by white rats of multiple-choice problems, but only a tendency to form right or left position habits.

Yerkes, working with an orangutan in a problem in which the animal was supposed to choose the door on the left of a series of open doors, found what he considered evidence of insight or of ideational learning. The animal suddenly solved the problem and continued correct solutions on succeeding trials.

Individual differences. When large numbers of animals are studied, great individual differences are evident. Some rats, for example, learn to run a maze in a very few trials; others require many trials. Some are active, running as much as 8 miles in the course of a day; others, equal in age and surroundings, travel as little as 180 feet a day. Some show intense fear when handled; others little. These individual differences are quite stable and dependable, the quick learners remaining quick throughout life; the active animals consistently covering more territory than the ones shown by earlier tests to be relatively inactive.

A most interesting study to determine to what extent individual differences in maze learning are due to heredity has been performed by Tryon¹ at the University of Cali-

¹ Tryon, R. C., "The Genetics of Learning Ability in Rats—a Preliminary Report," *University of California Publications in Psychology*, Vol. IV, pp. 71-85, 1929.

fornia. In this study, an attempt was made by selective breeding to develop two races of rats, a "bright" and a "dull" one. An unselected group of 142 rats was trained in a maze. The total number of errors on all trials in learning the maze was taken as the measure of learning capacity. The brightest members of the group were bred together and their progeny tested in the maze. Likewise the dull members of the group were bred together and their progeny tested. The assortive mating of bright with bright and dull with dull was continued generation after generation. By the F_8 generation, two races of rats had appeared, a bright and a dull one, with practically no overlapping between them, the dullest offspring of the bright strain and the brightest offspring of the dull one being approximately equal in learning ability. This study makes it evident that differences in ability to learn a maze are determined by hereditary constitution.

In a discussion of the limits of animal training, Watson, in 1914, pointed out the fact that animals reared in human surroundings develop abilities not evidenced by those kept in cages. He suggested the need for an experiment station where intelligent animals, such as the chimpanzee, could be brought up side by side with children and subjected to the same care, training, and psychological environment.

This was finally done in 1932, when the Kelloggs borrowed a seven-month-old female chimpanzee, Gua, and reared her for nine months with their ten-month-old son, Donald. The child and chimpanzee were given as nearly identical surroundings and treatment as possible. They were taught no "tricks," but were given every opportunity to develop. By the end of the nine months, the ape and the child had each gained from association with the

other. Donald was unusually precocious in climbing. Gua walked upright for long distances, responded readily to verbal commands, showed strong affection, and became thoroughly adapted to human surroundings, showing many bits of behavior which never would have developed if she had been reared in a cage. In Germany, an infant gorilla is being brought up in human fashion, so in time it will be known to what extent another of the great apes can adjust itself to a man-made civilization.

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CHAPTER XII

Measurement in Psychology

OBJECTIVE MEASUREMENT is one of the most recent developments in psychology, having come about almost entirely since the beginning of the twentieth century. Its definiteness gives it much popular appeal as well as technical usefulness, contrasting as it does so strikingly with the previous vague analyses of human traits. There are still fields in which relatively little analysis leading to exact measurement has been accomplished, but several aspects of human character and behavior can now be measured with much accuracy.

Standardization of tests. Before instruments for measuring can be considered ready for use in classifying individuals or in predicting future performance, norms or standards must be found in order to have a basis for evaluating individual scores. The process of finding norms is called standardization. Obviously the test must first be made. This involves analyzing the trait or function to be measured and devising questions or other test items that will reveal its presence. When a tentative set of test items is tried out on a number of individuals, some of the items as a rule prove to have no value for the intended purpose, and are replaced by others. Finally, after sufficient trials, a set of items is assembled that does seem to fit the requirements. The actual standardizing is a matter of administering the test to large groups of

individuals of the desired age, sex, training, or other characteristic, and finding the average performance for the group in question. For example, if a test for speed of tapping or for discrimination of pitch were being standardized, it would be a matter of determining the average scores of children on different age levels, of boys as compared with girls, and so on. The average score made by the ten-year-old group of boys, for instance, would be the "standard norm" for that age and sex. Detailed norms are available for many tests, giving not only the average score but the entire distribution, so that by comparison with the norms one can see whether a particular score ranks in the upper ten per cent of those tested, for example, or in the low quarter. On the basis of these standardized tests, it is now possible to analyze many of an individual's abilities, so that he may know in advance what chance he has of success in a certain vocation, and thus direct his energies into suitable channels with a minimum of random or misplaced effort, and so avoid failure and disappointment.

Types of Tests

Tests differ in various respects, and thus lend themselves to classification on several different bases. One way of classifying tests is according to the number of people tested simultaneously. The Binet scale and certain performance tests can be given to but one person at a time. These are called *individual* tests. But most tests are designed for *group* use, and may be given to any number of people at one time. The chief advantage of the individual test is that it permits more minute and accurate analysis of the individual. The main disadvan-

tage is that it takes a great deal of time. While the first few are being tested—and a trained psychologist must do the work—hundreds of others may be awaiting their turn. By the time the last individual test is finally given, perhaps months later, it may be too late to make use of the information obtained. With group tests, on the other hand, large numbers may be tested and classified or otherwise advised with but little delay. The scoring of the tests can be done by ordinary competent office help. In average school practice, group tests are given to the masses of students and individual tests only to those who constitute problems for one reason or another, or whose scores on group tests are unusual or inconsistent. Tests may also be classified as *verbal* or *nonverbal*. Those not requiring verbal responses are called “performance” tests. Practically all tests involving language are of the “paper-and-pencil” sort, as are some performance tests. In the latter, the individual may be required to do such things as indicate missing, superfluous, or wrong parts in pictures, or supply dots to complete a figure, making it symmetrical. Other performance tests are strictly manual in character. Some, involving such problems as correct assembling of simple mechanisms like mousetraps or door locks, are designed primarily to measure ability to deal with concrete objects, or as measures of mechanical intelligence. Others, presenting problems such as that of fitting differently shaped blocks in their correct holes on a form board, are intended mainly for those unable either to understand verbal instructions or to reply verbally. They are very useful in testing the intelligence of small children or illiterate adults, or persons having speech handicaps, like the deaf, or foreigners who cannot speak English.

A more important basis for classifying tests is according to trait or function measured. There are four main types of standardized tests: intelligence, aptitude, personality, and educational tests, although there is much overlapping and it is not always possible to draw clear-cut lines between them. Another important type, standardized usually only within the group devising and applying it, is the employment test. There are many others, most of them not well standardized, having to do with emotions, ethical conduct, esthetic perception, social attitudes, susceptibility to annoyance—in fact, a list of them would include almost every trait having external manifestation. Of the abilities tested, intelligence is of greatest importance for most considerations, since the degree and type of one's intelligence to a large extent determine all the other most vital elements in his life, including his occupation, behavior, associates, and pleasures.

Intelligence tests. Thorndike asserts that there are three types or kinds of intelligence: abstract, involving ability to learn or to deal with abstract thought; social, or ability to get along well with people; and mechanical, or ability to handle concrete objects or to see mechanical relations. Most so-called intelligence tests are designed to measure general, or abstract, intelligence, a fact which leads to much misinterpretation and inaccuracy. It tends to obscure the importance of social and mechanical abilities, and to put undue emphasis on the possession of abstract intelligence; undue because abstract-intelligence tests are mainly aptitude tests for school work or for intellectual pursuits. High, average, and low scores on such tests correspond fairly closely, respectively, with a high, average, or low quality of school work. There are very few good tests for mechanical intelligence, and fewer

still for social intelligence. But even if an individual were to give evidence of unusual ability in social lines, or high aptitude for mechanical matters, and make only an average score on an abstract intelligence test, there would be a marked tendency on the part of people uninformed in testing to consider him only average as a human being. In other words, popularly speaking, to be "intelligent" one must be apt in affairs requiring abstract intelligence. Owing to dissemination of superficial knowledge of I. Q.'s among people ignorant of the implications of mental testing, there is an unfortunate and growing tendency to look down on people incapable of successful college work, but entirely competent in other lines of activity.

Measurement in the field of *abstract intelligence* was begun in the first decade of the twentieth century by Binet, a French psychologist, who devised a test involving varied types of mental behavior: counting, giving the contents of passages read or heard, repeating digits, following directions, defining words, telling what to do in such everyday situations as being hungry or cold, and so forth. The items at the beginning of the test are easy enough for the average three-year-old child, and later items are graduated in difficulty so as to be suitable for children in successive stages of mental development. Binet was the first to use the mental-age concept: any person, no matter what his age, who makes the score of the average eight-year-old, for example, is said to have a *mental age* of eight years. Stern, a German psychologist, carried the concept a bit further, evolving the idea of a fixed ratio between mental and chronological age; and Terman, of Stanford University, suggested the term *intelligence quotient* for that ratio. The I. Q. is found by dividing the mental age by the chronological age and

multiplying by 100 to get rid of the decimal point. The average I. Q. is 100; for instance, if a child is eight years old both mentally and chronologically, his I. Q. is 100. This ratio remains relatively constant throughout life. A bright child will be a bright adult, and a dull and backward child a dull adult.

There have been several American revisions of the Binet test, the best and by far the most widely used being the Stanford Revision, done under Terman's supervision. The first revision appeared in 1916, and a later one, extended, amplified, and brought fully up to date, has just been issued (1937). The Herring Revision is also very good, and in addition is easier to give and score than the Stanford. Like Binet's original test, both the Herring and the Stanford Revisions are individual tests and are given orally.

The first and probably most widely known group test of abstract intelligence is the Army Alpha. Like the Binet test, which served as a standard for most later tests, it is based on the assumption that mentality is a composite of several abilities. Hence it tests different types of mental activity: following directions, solving problems, indicating word meanings, seeing relations, giving answers on information items, and the like. Since the completion in 1917 of this first group test of intelligence, the development of testing has proceeded at a rapid rate. Today there are group tests in abundance for every age level from kindergarten through college.

Social intelligence testing is an almost untouched field. In taking a social intelligence test, in the paper-and-pencil situation one may be able to answer questions as to propriety or to identify photographs; but it does not necessarily follow from that that his actual social ade-

quacy will tally with his knowledge. However high his score on the test, if he is bashful, he might be quite helpless, or at least very awkward, in the concrete situation. Furthermore, at a party or in a restaurant the occurrences are not set and made-to-order, with stereotyped responses invariably possible; if one is really socially adequate, his reactions will vary with the individual and the occasion. Hence, like some tests of ethical conduct, a test of social intelligence is likely to be merely a measure of knowledge regarding the best way to meet a situation; and does not necessarily indicate the actual practice of the individual when confronted with the need for meeting his fellowmen graciously or effectively. In other words, it turns out to be largely a test of abstract intelligence.

Measures of *mechanical intelligence* are somewhat more practicable and more numerous. Some require manipulation of objects, and others are of the paper-and-pencil variety. The latter present such problems as identifying tools or describing their uses, matching pictures of handles with the blade or head fitting the handle, as well as many much more complicated procedures. Such tests show a rather low correlation with tests of abstract intelligence. One who scores high on a test of mechanical ability is likely to do well in shopwork, but may or may not do satisfactory work in other courses.

Aptitude tests. Very closely related to intelligence tests are aptitude tests. As has been indicated, each of the three types of intelligence—abstract, social, and mechanical—constitutes in itself an aptitude for successful pursuit of any calling requiring that type of mentality. A high score on a mechanical-intelligence test, for instance, indicates aptitude for vocations demanding me-

chanical ingenuity. There are now a number of tests for measuring ability and interest along vocational lines. These tests are designed for use in assisting young people in their choice of a life work. The Strong Vocational Interest Blank probably best illustrates what is being done. The blank may be scored for interest in twenty-five or more vocations for men and eighteen for women. The individual filling out the blank is instructed to indicate his attitude toward each of four hundred items: whether he likes, is indifferent to, or dislikes it. Occupations, amusements, avocational activities, and various other aspects of life are covered very comprehensively. On the basis of this test, plus a good general intelligence test and suitable personality tests, a personnel adviser would be sufficiently informed as to a student's ability to be of real help to him in suggesting along what lines he should receive training.

Aptitudes for art and for music may be discovered by the use of the Lewerenz Test in Fundamental Abilities of Visual Art and the Seashore Measures of Musical Talent. The latter is especially valuable in that it may be used with fair success even with children. Ability to discriminate pitch is nearly as acute in childhood as later; hence if a child makes a very low score in pitch discrimination, the chances are that music lessons will be wasted on him. There are numerous aptitude tests, but these illustrate several types.

Personality tests. At the moment, personality tests are receiving perhaps more attention than any other type, and are of many different kinds testing various aspects of personality. There are general personality inventories as well as tests to measure extent of neurotic tendencies, dominance or submission, introversion or extroversion,

radicalism or conservatism. However, these tests are almost of necessity rather inconclusive and unsatisfactory since the individual's personality so often seems to vary from hour to hour. The answers to be given are not of the right-or-wrong sort, but demand merely a truthful response. The answer depends on the person. It is not "right," for instance, to want to be alone when opening a telegram, but if an individual does want companionship at such a time, he is different from one who does not. In spite of inconsistencies due to varying moods, the tests serve to indicate one's general attitude. One might tend toward one extreme or the other, introvert or extrovert, conservative or radical, though the great majority of people lie between the two extremes.

Educational tests. Unlike intelligence and aptitude tests, which aim to discover innate ability, educational tests measure achievement. They are designed to measure the degree of knowledge or skill one has acquired, are the most definite and objective of all tests, and in much the widest use, principally in the schoolroom. If it is desirable to investigate the extent of a student's knowledge of arithmetic, chemistry, or French, or his skill in penmanship, a standardized test may be given him and his proficiency evaluated with a high degree of accuracy. He may then be classified on the proper school level. Such tests are available for all elementary and high school subjects and many college subjects. Of course some tests are better than others and there are scores from which to select.

Employment tests. As their name implies, employment tests are used mainly in the business world in connection with the hiring of workers. They are not in such general use as are intelligence and educational tests, but

their use is spreading. Civil Service examinations illustrate the most carefully prepared types. The old trade tests, used during the World War but now largely outmoded, and tests such as those in stenography and typing require the applicant to demonstrate a certain degree of proficiency in the field in which he is applying for work. Others ask pertinent questions about the work, and possibly also ask for sample performances. Some requiring mechanical ingenuity try the applicant out on a miniature performance of the task to see how readily he can master the principles involved and put them into practice. But most large concerns that use tests set their own standards and make no effort to formulate norms that will have general application. In this they differ from the other main types which are adapted for universal use in this country.

Applications of Testing

What use is to be made of this objective knowledge resulting from the taking of all manner of tests? The only reason for making and taking tests is to put them to practical use. Of course we are all interested in knowing where we would be classified on a test—whether bright, average, or dull, emotionally stable or unstable, musical or otherwise, *ad infinitum*. But unless our knowledge is put to some constructive use, testing becomes merely a game. How can the family, the school, the court, and industry, as well as the individual, utilize the facts obtained?

To what use can the *home* put its knowledge of the child's abilities, disabilities, characteristics, and aptitudes? There seems to be no good reason why average

parents should be kept in ignorance of their child's capacities. That does not mean that the parents should have a complete knowledge of all details, for sometimes such knowledge would lead to discouragement and possibly to so hopeless an outlook as to work serious hardship on the child. Or if the child has some desirable aptitude to an unusual degree, the parents may do so much boasting as to make themselves and the child objects of derision and disgust, and thus hamper the child's advancement. But ordinarily it is to the distinct advantage of the child if the parents are informed when his abilities are in any way unusual. It gives them a chance to try to correct deficiencies, to give up false hopes of developing a certain capacity that turns out not to be in existence, and to magnify and encourage any positive excellence.

The following case affords an illustration of that point. One of the writers was called upon by a physician to give an intelligence test to one of his patients, the only son of a professional man. The mother was pathetically eager that her son follow in his father's footsteps; however, since the child at ten years was failing second grade work, she became alarmed and took him to a doctor for diagnosis. His I. Q. was about 85. The doctor began giving him glandular treatments in the hope of stimulating his mental development (the child was oversized physically), and twice more at intervals of a year asked that he be given a mental test. It was distressing to be obliged to tell the mother that it was very unlikely that her son would be able to do more than complete high school, though his I. Q. was about ten points higher than before treatment. However, she was an intelligent woman, and was reconciling herself to the inevitable and doing her best to train the boy in every way she could.

He was as pleasant a lad as one could meet, with unusually good manners. He courteously helped the psychologist on with her wraps, gathered up her materials while she talked with the mother, and in general gave every evidence of good breeding. He will never be a college graduate, but he will have the earmarks of a gentleman and may well become a helpful citizen, happy and able to make a good living in any one of several honorable callings, but not in a profession. It is much better for one to do well something he is mentally equipped to do, and to be happy, than to have his life ruined by trying to do something utterly beyond his power to do satisfactorily. Far too many people struggle into some calling not consistent with their abilities merely as the outcome of someone's ambition for them, and then remain at the very bottom as far as success is concerned.

The main thing the family can do with knowledge given by tests is to lay as good a foundation as the child's ability permits, so that the maximum training of which he is capable will be unencumbered by habits that have to be overcome. If parents feel any question as to whether or not their child is maturing properly at any stage of development, they should take him to a specialist. Had the boy just described been taken to the doctor earlier, it is probable that the glandular treatment given would have been more satisfactory. With knowledge, parents can attack any situation directly, and give the specific type of attention indicated.

The *school* can usually do more with its knowledge of the child than the home can. The parents may be informed that their child is superior or otherwise in some particular, but rarely should they know exactly how their

child compares with other children. In a good-sized town a certain boy of twelve made the highest mental test score of any child in town. His I. Q. was 150. His parents were told of this; they told the boy; he bragged and in general became so tiresome and indolent—being so “bright” he “didn’t have to study”—that it became a matter of serious concern to the school authorities. However, since he really was intelligent, his good sense came to his rescue when his teachers informed him that 150 is by no means an extraordinary I. Q., though it is high. They were in a position, as the family was not, to undo some of the damage. In general, unless the parents are known to use good sane judgment in such matters it is safer to tell them merely that their child did very well indeed (or somewhat poorly) rather than that their child made the best score in town (or the worst).

The school has access to all types of test scores—intelligence, personality, educational, and many others—and so can correlate and compare them, and direct the individual to the type of training that will be of most benefit to him. A student may have the aptitude, intelligence, ambition, and money to complete a certain course of study, medicine, or the ministry, but may not have the personality required to pursue that vocation successfully. It then becomes the duty of the school to suggest some calling which will engage the student’s capacities and interests, and in which his unfortunate personality—assuming that it cannot be corrected or offset—will not be a drawback. That is the type of advisory service the school is increasingly being called upon to give its young people. If one finds his first choice of a calling impossible, or at least not feasible, he should be able to find another in which he

will be happy and useful, and thus avoid the tragic sense of defeat he might otherwise experience. Most people can successfully pursue any one of several vocations.

The chief use to which the results of tests are put by the *courts* is in dealing with delinquents or problem children. The first questions asked by the court about young delinquents concern their mentality and the extent of their schooling. These vary considerably with the case, but neurotic tendencies and emotional instability are almost without exception characteristic of the problem child. The I. Q. of the delinquent is probably a little below 100; certainly his academic interests are definitely below average. On the other hand, his mechanical or concrete intelligence is about up to average, and hence constitutes no handicap. These facts in themselves may largely explain his delinquency. In other words, he is not adapted to the work the school offers him, is dissatisfied, is neither profitably nor entertainingly employed, and so gets into mischief in school or runs away. It is impossible to know exactly what should be substituted in school for much that is now offered until more careful study of the needs of such children has taken place; but it is one of our major educational problems and must be faced. The court would not be called on so often to deal with children if our schools were all they should be.

If the young delinquent is capable of ordinary schooling, it is necessary to find some type of school work for him, preferably in the public school; but the court has to keep an eye on him. If he is of very inferior ability, he may have to be committed to an institution where he will be unable to get into serious trouble; but even here his aptitudes come into consideration. He may be especially susceptible to an enjoyment of tools or gardening

or caring for animals, or he may enjoy music and be encouraged to try out for the band. It sometimes seems as though the courts, reform schools, and schools for defectives make a much more intelligent effort to discover and meet the needs of their charges than does the public school.

Industry puts the facts brought out by its tests to a very direct and immediate use in putting people at the specific work for which they are best adapted. In a large department store, if a color-blind clerk is at the ribbon counter, or a clumsy one in the glove-fitting department, there are likely to be many complaints from customers. But these features would not be handicaps in some parts of the store. Numerous illustrations might be given of such misfits: persons who are willing, capable, and honest, but who nevertheless are square pegs in round holes. The man with a slow reaction time tending a rapid machine becomes fatigued from the nervous strain of trying to keep up; while another man naturally quick in his reactions frets at waiting for his slow machine. An unhappy, introverted, and shy salesgirl becomes a valuable and contented employee when transferred to clerical work behind the scenes. Employment tests also show at once which new employees offer potential executive material. Even in the professions, misfits are of frequent occurrence; a girl with every qualification for successful teaching of small children, but not for handling adolescents, may be ruining her health and peace of mind attempting to teach in high school. In most large enterprises, shifting people from one sort of work to another more suitable type occurs constantly in the interest both of the individual being placed and of the management. It is good business to have employees who are adapted to the work.

What should the *individual* do with knowledge of his abilities? It is not necessary for the child to know whether he is bright or dull, but by adolescence the individual does need to know a few things about himself in order to begin planning his future. As has been suggested, ambitions incapable of being realized—as when a dull person wants to be a surgeon, or a tone-deaf individual aspires to be a band-director—need to be displaced by desires and wishes that can be fulfilled. On the other hand, too low or unworthy a goal needs to be elevated. If one discovers a valuable trait, such as musical or journalistic ability, he may cultivate it. If he finds a lack where he had hoped to find a talent, he may as well find it out first as last and direct his energies elsewhere. If he finds a trait that can and should be corrected, he can start at once to remodel himself along lines he prefers.

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CHAPTER XIII

Experiment in Psychology

EVERY SCIENCE consists of two distinct parts: the body of knowledge characteristic of that particular science, and the methods or techniques by which problems in that field are attacked and solved. In fact, advance or progress in a scientific field can be judged better by improvement of methods than by discovery of new truths. The results of an investigation are no more reliable than are the techniques by which they are obtained. Particularly in the field of psychology, where there is still so much popular reliance on traditional beliefs and casual observation, is it true that methods and techniques are of the greatest importance. One cannot put much credence in the conclusions of an experiment performed without adequate control of conditions or by antiquated methods when more effective techniques are available.

Let us suppose, for example, that one wishes to ascertain by experiment how development from the age of three to four is influenced by attendance at nursery school. It would not be sufficient to take a group of perhaps forty three-year-olds, test their mental, physical, and social prowess, send them to nursery school for a year, retest at the end of the year, and then conclude that the improvement is due to nursery school attendance. Such a study is inadequate because there is no means of distinguishing development due to influence of the nur-

nery school from that caused merely by increased maturity. Possibly the advance is due to a year of growth rather than to the stimulus offered by the nursery school. Even in studying a problem as simple and nontechnical as this, numerous variables must be controlled or held constant. The only way to measure accurately the effect of the nursery school in this problem is to have two groups of subjects who made equal records on the initial tests: one, the experimental group, attends nursery school for a year, and then takes the final series of tests; the other, the control group, takes initial and final tests but remains in the home environment during the intervening year. All factors are held constant except the variable to be studied, that of nursery school attendance. In selecting subjects for the experiment, the children must be paired off carefully and accurately; for each child in the experimental group there must be one in the control group equal in age, sex, background, and achievement on the initial tests. Thus, in order to get an experimental and a control group of forty each, very many more than the eighty finally included in the experiment must be given the initial tests. No child would be used in either group unless one of like characteristics is in the other group.

The effect of the year's growth in the home environment is shown by the difference between final and initial test scores of the control group; the difference between final and initial test scores of the experimental group shows development due to a year's growth in the home environment plus attendance at nursery school. The difference between final test scores of experimental and control groups shows the experimental factor, the influence of the nursery school. Nor is this result conclusive

and necessarily of wide applicability. If the home environment were poor, results would be different from those obtained when home environment is stimulating; an excellent nursery school and an indifferent one would not have equal influence. For discriminating and intelligent evaluation of reports on experimental work in any field, knowledge of the best or of standard procedures and techniques of experimentation in that field is essential.

An example from reaction-time experiments makes the need for insight into experimental procedures even more evident. In the traditional experiment measuring reaction time, the experimenter gives the signal by depressing a telegraph key which causes a light to flash or a buzzer to sound. The subject seated behind a screen depresses his telegraph key as soon as he sees or hears the signal. The reaction time is measured by a chronoscope, recording electrically in hundredths or thousandths of a second the interval elapsing from the time the experimenter pushes down his key until the subject depresses his. Numerous experiments have shown that under the conditions outlined above, simple reaction time to sound is shorter than to light. However, a carefully executed experiment, using twelve subjects and giving each subject hundreds of trials, reversed these results and indicated that reaction time to light is shorter than to sound. Examination of the report revealed that the reaction to light was made by depressing a telegraph key as quickly as possible after a light flashed. The auditory reaction time was obtained by having the experimenter give the signal by calling a word into a speaking disc, and the subject responded with a set word as soon as he heard, speaking against a voice key. Therein lies the explanation of the unusual results obtained in the latter experiment. The

more complicated neuro-muscular reactions introduced by substituting vocal stimulus and vocal response for buzzer and telegraph key account for the discrepancy. Results or conclusions mean nothing unless the methods used to obtain them are taken into consideration.

Methods of Experimental Psychology

There is no one limited body of knowledge characteristic of experimental psychology as distinct from any other psychology. The field of experimental psychology lies wherever experimental techniques and procedures can legitimately be used to throw light on behavior, and experimental techniques are essential in almost every branch of psychology. All recent advance in child psychology, abnormal, animal, advertising, industrial, and even theoretical psychology has come about primarily through experiment.

Psychology shares with all other sciences the method of controlled observation and experimentation. An experiment is an observation or series of observations in which the fact to be observed is isolated, repeated, or systematically varied, and in which the accuracy of the observation is safeguarded by use of mechanical devices, and by control, as far as possible, of the human element. Four factors are essential to a well-conducted experiment. (1) Isolation of the factor to be observed. Witnesses of even a very simple event fail to agree in their testimony when reporting an incident viewed casually, when no effort has been made to direct attention to essential points. (2) Control of factors to be observed and circumstances bearing on them. Span of apprehension is tested by observing groups of dots exposed a known

fraction of a second in a tachistoscope, not by a "glance" which cannot be standardized. (3) Repetition. The response must be repeated many times to iron out variable errors and to obtain reliability. Speed of reaction to a visual stimulus can be much more reliably determined by five hundred trials than by five. (4) Systematic variation of series of observations. In determining the point in peripheral vision at which different colors become visible, the experimenter starts with a color opposite the subject's ear, out of sight, and moves it slowly toward the nose, instructing the subject to signal when the color becomes visible. Next the color is held directly in front of the nose and moved slowly outward, the subject reporting the point at which the color disappears. Systematic variation of positions at which each color is exhibited eventually leads to location of the zones of color sensitivity in peripheral vision.

Means of isolation and control of variables to be studied. The psychologist has a more difficult task in isolating and controlling the factors under investigation than have most other scientists. The chemist can work with whatever chemicals he chooses, leaving the rest securely corked in bottles, but the psychologist must deal with the entire organism, with all the attendant complexities of mood, fatigue, motivation, and individual differences. Even though only color vision or speed of tapping is the actual variable to be studied, the functioning of the remainder of the individual cannot safely be ignored. Because of the complexity of the subject, techniques for effective isolation and control of attendant circumstances are of vital importance in psychological experimentation. Some of the methods of control are operative in any single observation; others have to do

only with repetition of observations to increase reliability.

Techniques of control over any single observation. The elaborate apparatus used in a psychological laboratory is employed as mechanical means of isolating and manipulating the stimulus-response situation. If results obtained in one experiment are to be compared with those of another, the same stimuli must be presented in the same way in both, and responses in both must be made under identical conditions. If an experimenter substitutes a home-made piece of apparatus, supposedly just as good, for the standard setup, he is changing the experimental situation, and results may vary accordingly. For this reason, use of standard apparatus is as important as employment of standard techniques. In a well-stocked laboratory, there are many *mechanical controls of the stimulus*, as illustrated by the stereoscope and standardized set of slides for study of perception of visual space; standard colors and color wheel with a known rate of rotation; and tuning forks of certain pitch. All these exist only as means of controlling the stimulus which the subject receives. The response is likewise predetermined, controlled, and of various types, such as a verbal response, pressing a telegraph key, sorting cards into marked compartments, or contractions of the muscles of the stomach wall. Wherever feasible, *mechanical recording of the response* is used to eliminate the human factor as far as possible. Changes in the rate and depth of respiration can be shown by means of a pneumograph fastened around the chest of the subject and connected by tube, tambour, and writing lever with the revolving drum of a kymograph, on which a graphic record of depth and rate of breathing is mechanically obtained. Without some such method of recording, accurate study of

breathing changes under various conditions would be impossible. In measuring speed of tapping, with each tap an electrical contact is automatically registered on an electric counter. The moving-picture film affords another example of accurate and mechanical recording of performance.

Control of the human factor is exerted partly through the training and instructions given to experimenter and subject. An efficient investigator needs an objective attitude and a technique of following directions and adhering to prescribed techniques without variation. The subject is controlled chiefly by receiving specific directions telling him what to observe or what to do; by training, for trained subjects are much more consistent in their responses than untrained ones; and by effort to keep motivation and surroundings constant throughout the experiment.

Repetition of observations. Even though the response is controlled as completely as possible, in order to obtain a high degree of reliability many repetitions must be made. If there are only a few trials, chance variations may greatly affect the results; repetition should eliminate them for practical purposes, in that variations in one direction would be offset by those in the opposite direction. In many types of experiment, it is also necessary to have practice periods to provide sufficient preliminary training so that improvement in the function due to learning does not appear as the experiment continues unless learning is the factor to be studied. For example, in measuring simple reaction time, there is a distinct shortening of reaction time in the first forty or fifty trials with increasing familiarity with the experimental setup, and increasing facility in use of the instruments. Hence, a

training period should generally be given before starting the experiment. In the actual experiment, many trials should also be given for greatest reliability.

In multiplying observations, the number of subjects must be considered as well as the number of responses made by each subject. If only a few subjects take part in the experiment, it becomes particularly important for them to be carefully selected and trained to reduce variations due to individual differences or to temporary conditions. For example, if the reaction time of five subjects is to be measured, the group average will not be typical if one practiced subject is half ill during the experiment, another uninterested, a third inexperienced. If a large number of subjects is used, such individual or temporary differences affect the ultimate results to a much smaller extent.

If there are many subjects, it is not ordinarily deemed essential to make numerous observations of each, as multiplication of subjects lessens the danger of unreliability of results. In certain kinds of experiment, it is customary to use a small group of subjects with many trials for each subject; in other types of study large groups of individuals are used as subjects, but only a few measurements of each individual are made. The reaction-time experiment, already frequently mentioned, affords an example of the first type of experiment, as most studies report results on about ten subjects with approximately five hundred to one thousand trials per subject. A study made by the writers¹ of the relation between certain physiological and psychological measurements illustrates

¹ Omwake, K. T., Dexter, E. S., and Lewis, L. W., "The Inter-Relations of Certain Physiological Measurements and Aspects of Personality," *Character and Personality*, Vol. III., No. 1, pp. 64-71, 1934.

the second type of experiment. In this investigation there were ninety-two subjects, each of whom was tested once in the various measurements used. Measures of blood pressure, pulse, and basal metabolic rate were obtained in individual tests, while intelligence, introversion-extroversion, dominance-submission, and other aspects of personality were measured in group tests. Still other records, such as scholastic average and extent of participation in extracurricular activities, were obtained for all the members of the group.

Another investigation made by the writers² illustrates even more clearly single measurements of large groups of subjects. The purpose of this experiment was to ascertain the relation between accent in French and ability to discriminate slight differences in pitch. In order to determine this relationship, it was necessary to get accurate ratings of the French accent of hundreds of high school and college students, and to give to each one a test for pitch discrimination.

In all experiments involving either large numbers of cases or of measurements of each individual, statistical methods of handling the data are necessary. The average and the median are the best single measures of the central tendency of the group. The best way to compare the time of simple reaction to a visual stimulus with simple reaction to an auditory stimulus is to give average time for each in hundredths or thousandths of a second. But a comparison of the averages alone does not give a clear picture. It is still necessary to determine statistically the reliability of the difference between the two

² Dexter, E. S., and Omwake, K. T., "The Relation between Pitch Discrimination and Accent in Modern Languages," *Journal of Applied Psychology*, Vol. XVIII, No. 2, pp. 267-271, 1934.

averages in terms of the chances in 100 of the difference being a true difference. If, in the example quoted above, there are 98 chances in 100 that there is a true difference, one can feel that there is a real difference between visual and auditory reaction time; but if there are only about 50 chances in 100 of a true difference, any slight difference in averages is to be ignored.

In addition to measures of central tendency and of reliability of group differences, the experimenter often needs to report variability, or scatter, of the cases. Standard deviation, showing in terms of score points the range of the middle two thirds of the cases, is most extensively used: the smaller the standard deviation, the more bunched about the average are the cases; the larger the standard deviation, the more widely scattered are the cases. Another statistical device for interpreting the data resulting from experimentation is the coefficient of correlation, showing the degree of relationship. In the study of French accent and pitch discrimination, the relation between these two variables was shown by the correlation method.

Kinds of observation. At present, a great many psychological experiments are wholly objective, but some supplement objective observation by introspective reports, and still others are interested primarily in introspection. Most of the experiments already cited are of the objective sort, rendered so by mechanical devices for stimulation and for recording responses of the subject, and capable of repetition by other investigators. Studies of animal learning in mazes or problem boxes, of conditioned reflexes, speed of tapping, and muscular steadiness are wholly objective with emphasis on the reaction of the subject rather than on inner consciousness.

Subjective or introspective observation views the reaction from the point of view of the reacting individual in terms of consciousness. This is the only method which belongs solely and peculiarly to psychology. But although introspection is the distinctive psychological method, it is limited in application, and needs to be supplemented by experiment and observation of behavior. The simplest and most superficial type of introspection is the verbal statement reporting the presence or quality of a sensation without describing it in further detail. Indicating the highest audible note illustrates a verbal report based on simple introspection, as does identifying a color as red, or reporting a sensation of cold when touched on a certain spot on the skin. Behaviorists who theoretically deny the existence of consciousness and refuse to recognize introspection as a scientific method call this type of introspection "verbal report." Under this guise they make constant use of it, emphasizing the objectivity of the report itself and ignoring the subjective process on which the report is based. Some introspection is obviously essential; otherwise, how is one to approach the study of afterimages? Or how does one judge emotion from facial expression? Or investigate the apparent solidity of figures viewed in a stereoscope?

A far less superficial type of introspective process is seen in analytic introspection, in which a trained and experienced introspectionist analyzes mental processes to find the elements of mental life and their arrangement. This is the form relied upon by the existentialists. A third form of introspection is the description of conscious experience without analysis, taking natural "wholes" as units. The latter is the form preferred by adherents of the Gestalt school.

Qualitative versus quantitative data. Investigations conducted by either objective or subjective methods may result merely in qualitative data, or may culminate in measurement of a quantitative sort, or in a combination of the two. Qualitative data give an answer to the question "What?" What kind of sensation—visual, auditory, or tactual? What color is the disc? Quantitative measurements answer the questions "How much?," "How long?," or "How many?" In the tapping test, how many times can the individual tap in thirty seconds? How many contacts or errors does he make in the motor co-ordination test in thirty seconds? What is the speed of reaction to an auditory stimulus? As a science advances, there is progress from purely descriptive observation of qualitative differences to quantitative measurement, without which real science cannot exist.

Criteria for the Evaluation of Experimental Studies

While in the foregoing discussion considerable emphasis has been placed on methods and techniques of experimentation, one must not gain the impression that method is everything. The accurate, careful investigation of a problem that has little intrinsic merit may be a much less valuable contribution to knowledge than a poorly executed attack on a fundamental problem that had hitherto been unnoticed. Critical appraisal of experimental work in a scientific field necessitates considerable familiarity with previous investigations in that field as to problem, methods of attack, and conclusions. While it is recognized that there is no known short cut to proficiency in this function, the following suggestions are designed to offer at least a basis for attempting to evaluate experimental work.

In the first place, is there a clear-cut and definite *problem*? Is it one which can be attacked by available techniques?

Is the *method* adequate for the solution of the problem? Are the subjects suitable in sex, age, numbers, and so on? Has a definite procedure been planned in advance and firmly adhered to throughout the experiment? Were full and accurate records made at the time of the experimenting?

Are the *results* well organized and clearly presented? Are the statistical measures used suitable? Are tables and graphs well worked out and clearly labeled? Have all essential facts been presented and interpreted?

Are all the *conclusions* that are drawn justified? Has the writer overlooked any important trend? Has the problem that was undertaken been adequately solved? What kind of contribution is made by the investigation? Is it a contribution to methodology? An addition to practical knowledge? to theory? Does it open a new field of investigation? Or is it of little or no value?

A brief summary of a minor study undertaken by one of the writers¹ will serve to illustrate the form in which many reports of experimental investigations are cast and at the same time afford exercise in intelligent criticism of experimental procedures and conclusions. The study is summarized here merely as an example, not as being in any way epoch-making or as epitomizing perfection in experimentation in psychology.

The study was undertaken to supplement a previous study of stability or steadiness in which the writer had served as one of the subjects. In this earlier study,

¹ Omwake, K. T., "Effect of Varying Periods of Sleep on Nervous Stability," *Journal of Applied Psychology*, Vol. XVI, No. 6, pp. 623-631, 1932.

measurements of steadiness taken at two-hour intervals throughout the day, beginning at eight o'clock in the morning, showed a characteristic diurnal curve, with nervous stability reaching its optimum at two in the afternoon and decreasing thereafter.

Problem. The problem undertaken in the follow-up investigation was that of discovering the effect on nervous stability of sleep in varying amounts, and at the same time of extending the study of steadiness to the hours of the night.

Method. The subjects in the experiment were five young women, who carried on their usual activities of studying and teaching during the three weeks of the experiment, being restricted only as to amount of sleep and time of retirement. Three tests of nervous stability were used. Lack of body steadiness or amount of body sway was measured by having the subject stand for sixty seconds on a Moss wobblemeter, which consists of a balanced platform, movements of which are mechanically recorded. Steadiness of the hand and arm was measured by use of the standard co-ordination plate, consisting of a metal sheet with holes of varying sizes into which the subject was to insert an electric stylus and hold it, if possible, without contact with the sides for a period of forty-five seconds. The third test was a number checking test, in which the subject was to check each occurrence of a particular digit in a sheet of a thousand figures. Each test series consisted of four trials on each of the three tests taken in rotation.

Before the beginning of the actual experiment, the subjects were given sufficient preliminary exercise in all the tests to eliminate improvement due to practice. Records to serve as a basis for comparison were then made at two

o'clock in the afternoon, the hour of greatest steadiness, and also at bedtime. During the weeks of the experiment, each subject was awakened nightly after a determined number of hours of sleep and immediately put through the battery of tests. One night all subjects were tested after two hours of sleep, the next night after six hours, the next after eight, and then after four. Three subjects ran through the tests after two, four, six, and eight hours of sleep three different times, so that records were available for twelve nights, with four measurements on each test for each night. Because of illness, it was possible to continue the tests of the other two subjects only eight nights, so that for these two subjects there were only eight records on each test made after each period of sleep.

Results. All tests show the same general trends. In all three the record showing greatest nervous stability was made in the early afternoon. In all three a decrease in steadiness was evident in the tests made at bedtime. Instability was most marked in all tests after two hours of sleep, and decreased with succeeding hours of sleep, until the records made immediately after waking in the morning about equaled those obtained just before going to bed. The original report of the experiment showed in the form of graphs the records of each subject after each period of sleep.

Conclusions. "1. There is a close relation between the length of the preceding period of sleep and nervous stability.

"2. Nervous stability is far less after two hours of sleep than at bedtime after a strenuous day.

"3. Nervous stability increases with increasing amounts of sleep.

"4. Greatest nervous stability is found in the early afternoon, a warming-up period evidently being essential to greatest efficiency."¹

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¹ *Ibid.*, p. 631.

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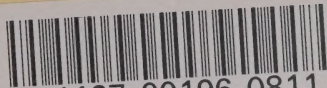
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